

THE IRON AGE

THURSDAY, JANUARY 19, 1888.

The De La Vergne Refrigerating Machine.

In the line of refrigerating machinery increased attention has of late years again been given to the system of mechanical compression of anhydrous gas, accomplished by means of powerful vacuum and compression pumps. The mechanical difficulties, however, encountered in pumping a gas of the extreme tenuity of ammonia for example, this being the agent employed, were such as to make progress very slow for a time, until more recently experience and careful investigation enabled a more thorough satisfying of the requirements of

stroke, a certain quantity of lubricating oil, which effectually seals the stuffing-box, piston, and valves, fills all clearances, and takes up the heat developed during compression. The compressor is erected vertically and the cylinder is a little longer than the stroke, thus providing a chamber at the lower or stuffing-box end, which is always filled with the oil, thus completely and permanently sealing the stuffing-box. Besides obviating the necessity of tight packing, the oil thoroughly lubricates both piston and rod, reducing the friction to a minimum. In following the compressor piston through a complete double stroke we will assume that it is beginning its upward

The lubricant for cooling the pump and sealing its valves and piston-rod is injected through the small aperture at the bottom and left side of the pump, shown under the gas inlet, during the return stroke of the piston. It will be observed that the cylinder is fully charged with gas before the introduction of the lubricant, and that the latter does not occupy any space to the exclusion of gas. As the piston descends, it becomes submerged in the oil collected in the bottom of the cylinder, and a small quantity of it passes through the open valve to the upper side of the piston, and effectually seals the piston and prevents a leakage of gas past it during the act of

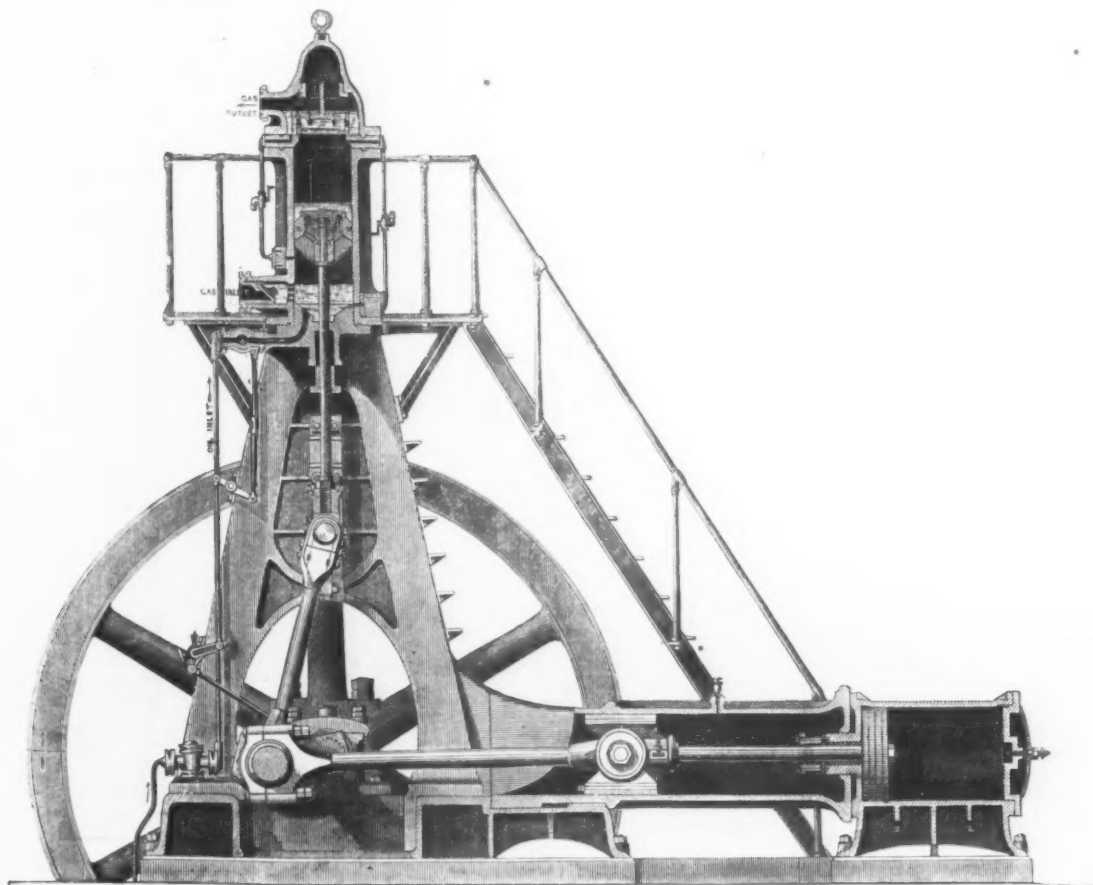


Fig. 1.—Section and Elevation.

REFRIGERATING MACHINE, BUILT BY THE DE LA VERGNE REFRIGERATING MACHINE CO., NEW YORK.

successful working. These are essentially to discharge the entire volume of the gas entering the compressors; to prevent all leakage past the stuffing-boxes, pistons and valves, and, finally, to extract the heat from the gas during compression. All this, we are told, has been fully accomplished in the machine built by the De La Vergne Refrigerating Machine Company, of New York, of which we publish a number of engravings.

The section and elevation on this page will give a very good idea of the machine as a whole, though for a better understanding of the operations in the compressing cylinder we would refer our readers to Fig. 2. This represents an enlarged vertical section of this cylinder and clearly shows the peculiarities of its design. The several requirements of successful mechanical refrigeration which we have just enumerated are here satisfied by injecting into the compressor, at each

travel. The gas then enters the cylinder from the return mains through the large opening on the left-hand side near the bottom of the pump, a swinging check valve being arranged in it as shown. On the return stroke this valve in the gas inlet closes and the gas in the cylinder passes to the upper side of the piston through a valve in the piston, which opens as soon as the valve in the gas inlet closes. The arrangement of this valve will be understood with little difficulty. It will be observed that a nut is screwed on to the end of the piston rod, being designed to act as a stop to the travel of the valve, preventing the latter from slipping off. The small helical spring shown immediately under the nut performs the office of a buffer simply, avoiding the shock which would otherwise result from the striking of the valve against its stop. It is not intended to effect the seating of the valve, this being accomplished by the weight of the latter.

compression or during its upward stroke. A sufficient body of the oil is introduced to the upper side of the piston to enable the driving out of all the gas, and, with it, a portion of the oil which passes through the discharge valve in the top of the cylinder, and which seals this valve upon the return of the piston. The piston rod is continually liquid-sealed by the remaining oil surrounding it.

The discharge valve in the top of the cylinder is a simple bucket valve, suitably guided and furnished with a central stop. The compressed gas passes off through the outlet at the left. We need scarcely direct attention to the fact that the piston is at all times thoroughly lubricated and sealed against leakage. A very striking illustration of this was brought to our notice by Mr. Louis Block, chief engineer of the De La Vergne Company. Mr. Block remarked that in one of their compressors, in every-day operation, one of the bolts in

the valve in the piston managed to work off and roll down the inclined side of the piston against the cylinder wall. On the next up stroke the bolt was caught in the small hole for indicator use, shown tapped into the cylinder wall at the left, and, being forcibly carried along by the piston, cut a deep groove into the cylinder. It was at first thought necessary to rebore the latter, but application of the indicator failed to show any leakage whatever. The explanation, of course, is that during the up stroke the oil on top of the piston does not have sufficient time to leak past and afford a passage to the gas. The piston has only one cast-iron ring. The practical result which the makers claim to obtain by the use of the oil is the consumption of less fuel, less ammonia and less water by their machines than by other types.

After leaving the compressor the gas is subjected to a cooling process. All gases when compressed are decreased in volume and increased in temperature, and to produce liquefaction in the case of a liquefiable gas, it must be cooled by some natural means. The cooling process first abstracts the sensible heat of the gas until it has reached its point of liquefaction. In this condition any further cooling liquefies a portion of the gas, and this goes on continually until all the gas is condensed, always provided, however, that the pressure is kept up by the continued operation of the compressor. In this manner the latent heat of the gas is carried away. The medium usually employed for cooling is water at as low a temperature as it can be obtained with economy; the colder the water the less of it will be required, and it should, if possible, be free from deleterious substances, so that after performing the cooling required it can be used for other purposes. A form of condenser frequently used consists of a coil placed vertically with a gutter at the top of the supporting frame, from which the cooling water is delivered in fine streams or showered upon the upper pipe, and as it trickles downward, from pipe to pipe, its temperature is increased as it descends, by its absorption of heat from the liquefying gas.

The condenser adopted by the De La Vergne Company is of this latter class, but possesses additional features which will be best understood from Fig. 3. This engraving represents, in one elevation, the whole process through which the oil and ammonia pass. The path of the gas and oil, and of the former alone, after the oil has been separated, can be readily traced, the different pipes being furnished with references. The small pipe-coil on the left side is the oil-cooler, through which the oil passes from the compressors, and where it is cooled by the showering water, prior to its re-introduction into the compressing pump. At the end of the main condensers will be seen a series of small pipes, called the "liquid pipes," which are united for each condenser into one short pipe of larger diameter, called the "liquid header." The liquid pipes serve to carry away the condensed ammonia from separate sections of the condensing coil, so as to keep the latter "dry," and, to the fullest extent utilize its surface for the purpose of abstracting heat from the gas.

The condenser, as shown in the cut, resembles in principle the Baudelot cooler of the brewer, which has proved probably the most efficient form of cooler yet introduced for rapidly extracting heat from a liquid with a minimum quantity of cooling water. By reason of the thin stratum of water passing over the pipes, and its being kept in a constant motion, and its direct contact with the pipes, the surface film of water which ordinarily adheres so tenaciously to the pipes in submerged condensers is entirely avoided. The warm compressed gas is admitted at the bottom instead of at the top of the condenser, and the warmest gas is thus exposed to

the warmest water. The gas ascending in the condenser constantly meets colder water until its temperature is almost reduced to the temperature of the water where it first comes on the condenser, when liquefaction takes place. The water, on the contrary, in its downward passage meets warmer gas, and is thereby in-

ducted through the discharge-pipe to a cylindrical tank placed vertically, from the top of which the gas continues on its passage to the condensers. Any oil that may be carried along with the ammonia is conveyed with it through the condensers to a second tank, placed on an incline and called the storage tank. From this the

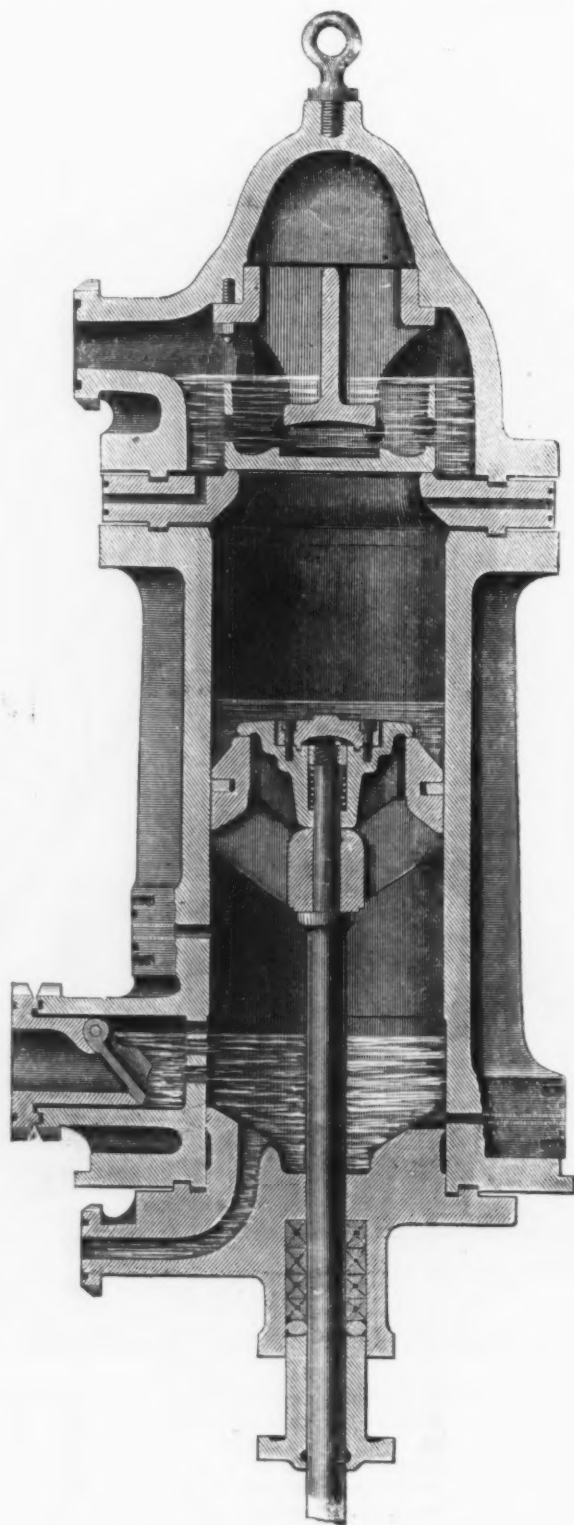


Fig. 2.—Vertical Section of Compressor Cylinder.

THE DE LA VERGNE REFRIGERATING MACHINE.

creased in temperature until it finally leaves the condenser at the bottom, charged with more heat than the same quantity would otherwise be capable of extracting. Spattering is prevented by attaching fins or strips of metal to the under sides of the pipes, which lead the water in its descent.

From an examination of Fig. 3 it will be seen that the gas and the oil discharged at each stroke of the compressor are con-

liquid ammonia passes to another vertical storage tank, and here the small traces of lubricating liquid mixed with the ammonia separate from the latter in settling down to the bottom, the oil being heavier than the ammonia. From time to time this oil may be drawn off through certain pipes and cocks, arranged for the purpose, into the first separating tank, which is located somewhat lower down. The oil deposited in the first separating tank is

warm, having in its passage through the compressor abstracted heat developed during compression. From the bottom of this tank it is conducted to the oil cooler already mentioned. From this it is discharged into another tank—the cold-oil tank—from which it is pumped or forced by pressure to repeat the same round of operations. These auxiliaries, though in-

pipes placed in the rooms to be cooled. To obtain the necessary cooling surface the expansion pipes, as shown in the engraving, are furnished with cast-iron disks which are made in halves and are attached by means of iron clips. These clips press the two halves together against the pipes. The cooling surface of the latter is, in this way, increased to such an extent that, we

are attached, the De La Vergne Company use what they call a "screwed and soldered" joint. This we show in Figs. 4 and 5. It will be noticed that the thread in the fitting into which the pipe thread screws does not reach entirely to the outside. It is enlarged to the depth of $\frac{1}{2}$ to $\frac{3}{4}$ inch, forming a smooth annular space around the pipe beyond the termination of its thread. All the fittings are made of malleable iron or steel, which admit of being well tinned, and thus a screwed and soldered joint is formed by entirely filling the annular recess, formed on the outside by the fitting and on the inside by the pipe, with solder. The result is that the thread of the pipe is entirely covered and that the otherwise weakest part of the pipe is made the strongest. In overrunning the test pressure of 1000 pounds to the square inch, at which all the pipes, fittings and cocks are tested, to the point of bursting, we understand that the pipe is always ripped open before this joint gives out. The pressure in the main condensers, we should here add, is about 150 pounds. The flange union shown in Figs. 4 and 5 by which two pieces of pipe connections are bolted together, is further made tight by a lead gasket, as shown. This arrangement, it will be observed from Figs. 1 and 2, is also used in all other joints. The expansion cock used by the makers to regulate the flow of liquid into the expansion coils is of some interest. Since this regulation must be of the nicest kind the passage through the plug is constructed as follows: The round opening does not entirely pass through, and the thin remaining bridge of metal is perforated in the shape of a very narrow wedge, the point of which is the first to open. Movement is imparted to the plug by a worm and worm-wheel, thus insuring adjustment of a most delicate character.

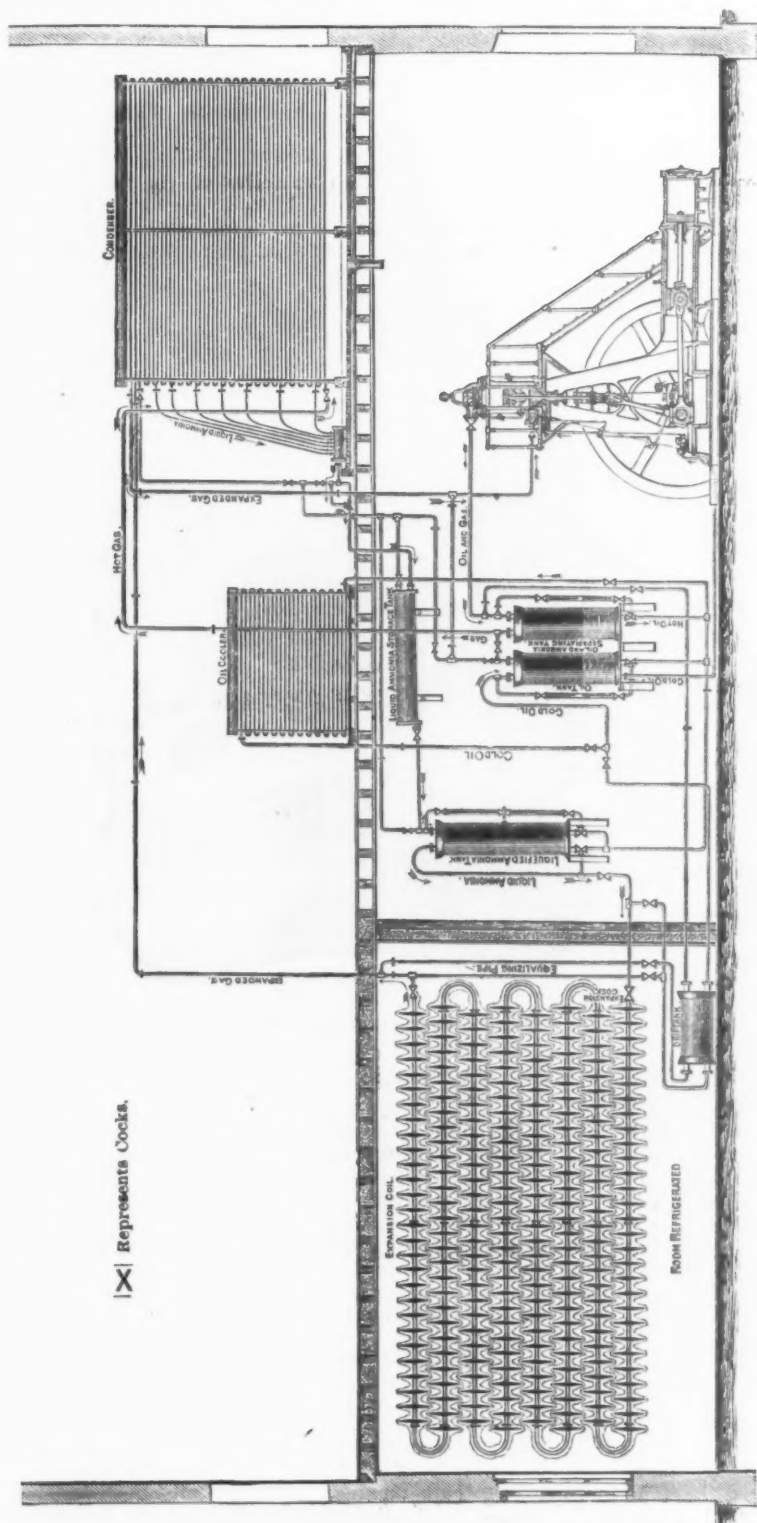
In selecting the driving engine for their machines, the company decided on two kinds: The Corliss cut-off for the larger machines and the Tremper cut-off and governor for the smaller sizes. Both give almost equally good results as far as economy is concerned, and the former is so well known the world over that it requires no further comment. Fig. 1 on the first page shows the general arrangement of the engine and compressor. The engine and one compressor are coupled to the same crank, thus compelling the steam to exert its greatest power at the point of greatest resistance of the compressor-piston.

In Fig. 6 we present an indicator diagram, taken from a 12 x 24 compressor cylinder, for the purpose of showing the efficiency of the sealing and lubricating liquid working between extreme limits of pressure. The direct pressure in this case was 194 pounds; the back pressure 9 pounds. The actual horse-power indicated by the card equals 30 horse-power. The horse-power measured to the adiabatic curve equals 36.5 horse-power. The power economized by each compressor equals 6.5 horse-power.

One of the De La Vergne Company's plants is in full operation in this city in the brewery of Mr. George Ehret. This we had occasion to examine with much interest a few days ago.

Several new cars are being fitted with new steam-heating apparatus at the Pennsylvania Railroad's shops at Altoona, and in a few weeks two trains will be put upon the road to test the arrangement practically. The company have experimented with several methods of heating by steam in the past year, and the master machinists think they have found one which will answer every purpose. While its application may be changed somewhat they feel certain that the principle involved is the right one. As soon as extreme cold weather comes the cars that have been fitted with

Fig. 3.—Diagram of Complete Plant.
REFRIGERATING MACHINE, BUILT BY THE DE LA VERGNE REFRIGERATING MACHINE CO., NEW YORK.



creasing the first cost of the machine, are claimed to yield greater economy of fuel, water, repairs, &c. In order to control the flow of the oil through the system a regulating cock is placed in the pipe connecting the first separating or hot-oil tank with the cold-oil tank. Glass gauges attached to the tanks permit of ascertaining the heights at which the several liquids stand and thus give the attendant complete control of the apparatus.

The third operation in the cycle is the expansion of the ammonia direct through

are informed, now only one foot of pipe is needed where formerly four were required. The irregular outline shown around the coils and disks in our engraving represents frost. It is perhaps unnecessary to add that the application of the disk is based upon the principle now used in some steam radiators, in which the heating surface exposed to the air is increased by means of flanges and projections added to the outside surface of the radiator.

To insure perfect tightness between the pipes proper and the fittings to which they

the apparatus will be formed into two trains and a thorough test will be made. If it proves entirely satisfactory it will be adopted and will be put into every passenger car run by the company.

Copper Steam-Pipes.

In one of the reports on the explosion of the copper steam-pipe on board the English steamship Elbe, to which we referred at the time of the accident, we find it stated that with copper steam-pipes in general the tensile strength usually assumed in calculation is too high. While the tensile strength of good sheet copper probably varies from about 30,000 pounds to 33,000 pounds per square inch, it must be remembered that the copper has been toughened by the process of rolling, but when it is afterward worked in the fire it loses a con-

would be very difficult; at any rate the formula obtained would be most unwieldy, and in order to be of practical value the expression for the thickness required must be to some extent empirical. When calculating the strength of a copper pipe the effects of temperature, among other things, should not be overlooked, there being a rapid diminution in the tensile strength of copper with only a moderate increase of temperature. It is recommended accordingly that the usual hydraulic test for brazed steam-pipes should be materially increased, and after the pipes are fitted into the ship the whole range of piping, as well as the stop-valves, &c., should be tested to at least double the working pressure. It is very difficult to provide for all cases, but in this instance, if the stop-valves had been so arranged that they could have been closed from the deck, &c., earlier access could have been obtained to the stokehole, and, in addition,

There is also a large amount of work going on in the fitting up of tubes, hoops, &c., for other guns. In addition to the gun work there are in progress four turret mounts for the Miantonomoh's 10-inch guns, and four central pivot carriages for 6-inch guns. In the foundry there are 1000 cast-iron shells for 6-inch guns. Work on the secondary battery for the Chicago has been discontinued for the present, and will not be resumed until a further appropriation is made.

American Agricultural Machinery in New South Wales.

The United States consul at Sidney in a recent report refers to the position of American agricultural machinery in New South Wales in the following manner: The Australians prefer their own plows

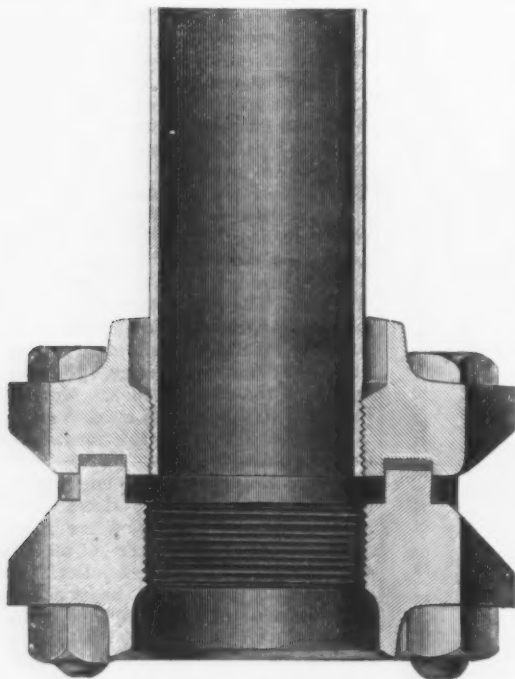


Fig. 4.—Section of 2-Inch Flange Union.



Fig. 5.—General View of Flange Union.

THE DE LA VERGNE REFRIGERATING MACHINE.

siderable portion of its strength. This of course the subsequent planishing received by the pipe somewhat restores, but when the flanges are brazed on, the copper, for several inches from the flange, is again softened, and in this state the pipes are usually fitted, for if further planishing is attempted the brazing at the flanges is likely to be started. From this point of view it would appear desirable to leave the whole pipe unplanned, and so avoid possible injury by the hammer. For high pressure especially it is desirable that copper steam-pipes should be solid drawn or have their longitudinal seams riveted, as by so making them their value could be more certainly estimated, and the risk of overheating, &c., would be minimized.

Messrs. Peter Samson and W. H. Woodthorpe, who prepared the particular report considered, say further that they examined various rules which are said to be used by different firms in designing copper steam-pipes, but none of these appear to us to be wholly satisfactory. A high factor of safety is commonly thought to be necessary for such pipes, but while some have an apparent factor of safety of from 10 to 15, the real factor is often far less. There are many considerations which it is necessary to have in view when framing a rule for thickness of steam-pipes, and to formulate one which would give full effect to them

the risk of injury to the boilers from shortness of water would have been obviated. It would also seem desirable to fit each boiler with a reliable valve which would close automatically in the event of the steam-pipes bursting, but which would not act in ordinary cases of priming; however, such a valve has yet to be devised.

In connection with the above the subjoined table will prove of interest, giving the results of a series of experiments, with the view of ascertaining the effect of temperature on copper:

No.	Degrees F.	Tenacity at these temperatures in lbs.	Tenacity cold in lbs.	Remarks.
1	370	21,400	28,100	Percentage of loss by raising copper from 60° to 360° = 18 per cent.
2	370	24,300	27,500	
3	332	21,900	....
4	300	21,400	....
5	150	25,000	....

The work now in progress at the naval gun shop in the Washington Navy Yard employs nearly 400 men. There are now under construction four 10-inch steel breech-loading rifled guns for the monitor Miantonomoh, and ten 6-inch steel breech-loading rifled guns for general service.

to any other, although they are much clumsier, heavier and more expensive than those from the United States. The plows generally in use are the ordinary two and three furrow ones, made wholly of iron. The Australian farmer has a decided objection to the use of plows with wooden handles. Several Louisville and St. Louis firms have built up a trade in American plows, especially in this colony and Queensland; but these implements have been manufactured for the Australian market from plans furnished by agents who visited the colonies and remained long enough to understand the requirements of the Australian farmer. American harrows are rapidly supplanting all others, especially the American disk harrows, for with them the farmers in many cases are enabled to dispense with the use of plows. In binders and reapers the Americans have heretofore had a decided advantage, but English manufacturers now make such close imitations of them that the competition for the trade in these articles is very keen. In some portions of the colonies the American stripper is preferred to the binder and reaper. The stripper, though usually called an Australian invention, is an adaptation of an American machine which has been for many years in use in California and other Western States. It cuts the grain and dispenses with the necessity for

threshing it. The stripper is operated like the binder and reaper, but it is fitted in front with a combining apparatus, which catches the heads of the grain, strips them off, and passes them into a box, from which they are discharged in a heap and put through a cleaner. The machine can cut from 5 to 9 acres of wheat per day, according to the condition of the crop and weather.

In wet weather, or in early morning, it does not act well. Some of the machines have placed in them ordinary threshing drums, which thresh any heads not stripped. The machines with drums attached are called damp-weather strippers. The stripper was first made in Adelaide, South Australia, where it is more popular than in any of the other colonies, but recently factories for its manufacture have been established in Melbourne and Sydney. The introduction of the American binder and reaper did not at first interfere with the supremacy of the stripper, especially in

moved from the furnace, and protected by the cup in which it is set, that it can only be fused by the boiler plates getting hot—a consideration of importance. The plug, we understand, has already come into extended use.

A Large Disappearing Gun.—The largest gun that has ever been mounted on a disappearing carriage has recently undergone trial at the proof grounds of the English firm, Messrs. Armstrong, Mitchell & Co., at Sillith. The gun and its carriage have been manufactured at the Elswick Works, for the Government of Victoria for the coast of the colony. Under ordinary conditions the gun is entirely hidden from view in a pit, and is raised into firing position by the action of compressed air working in a cylinder, thus remaining exposed to the enemy's fire for a few seconds only. The recoil of the gun itself compresses the air, so that the weapon is in a sense automatic. By an

60 x 32 feet, on the other side. The boilers are placed to the left of the casthouse, in front of the engine-house, while the draft stack is located in front of the boilers. The furnace itself is 75 feet high by 18-foot bosh, 10-foot crucible and 10-foot bell. It is to be blown through seven 6-inch tuyeres, and will be equipped with three Gordon-Whitwell stoves, 65 feet high and 20 feet in diameter. The down-comer will have a diameter of 72 inches, and will be equipped with a dust catcher 14 feet in diameter and 18 feet high. The two Gordon, Strobel & Laureau engines will have 38-inch steam cylinder, 84-inch blowing cylinder, and 4-foot stroke. The twelve boilers, 34 feet long by 46 inches diameter, are of the double flue type with two 15-inch flues. The draft stack will be 100 feet high by 6 feet in diameter, and the hoist chosen is that built by the Crane Bros. The foundations for the furnace are all in, and the work of putting up the building is now progressing. The management expect to have the furnace in blast about the 1st of November, 1888, the capacity being rated at 125 tons. The furnace itself is placed in the immediate proximity of the river.

Steam Navigation in the Pacific.

The Canadian Pacific Railway Company is about to build three steamers for its Pacific mail service. These steamers are to have an average speed of 15 knots per hour, and they will cost between them something over \$2,250,000. The first steamer of the new Marquis del Campo Line, between Panama and San Francisco, arrived in Panama Bay August 25. The Pacific fleet will comprise eight ships—the Guatemala, Nicaragua, Honduras, Costa Rica, Salvador, Mexico, Espana and Madrid—and it is said that each ship will fly the flag of the republic whose name it bears. The Atlantic contingent, with its terminus at Colon, will comprise only five ships.

In a lecture to the Society of Arts we notice that Sir Philip Magnus referred to the necessity of commercial education in the following words: "When we hear, as we often do, successful manufacturers and merchants speak discouragingly of the necessity of commercial education, and tells us how—sent into the factory or office at an early age—they acquired the practical experience to which they ascribe their fortune, we cannot but feel that such men overlook the fact that the conditions under which trade is now carried on are wholly different from what they were 50 years ago; and it is owing to this difference that other and special kinds of training have become indispensable. No one can contemplate the changes which have taken place during the present half-century without realizing their leveling influence on the development of commerce, and the growing importance, as a factor of mercantile success, of that wider knowledge which enables those engaged in commerce to understand and to take advantage of all favorable conditions in the conduct of business operations. The merchant's vision must extend beyond the limits of his own town or country. His observations must be widened, so that literally he may be able 'to survey mankind from China to Peru.' The range of his markets is continually extending, and his knowledge should be co-extensive with the area of his transactions. Education must adapt itself to these changed conditions. But education follows, and always at a great distance, social and intellectual changes; and the agitation for educational reform, which is now everywhere heard, is the expression of the conviction that education must be made to fulfil its proper function of training our young people for the work they have to do in the present altered

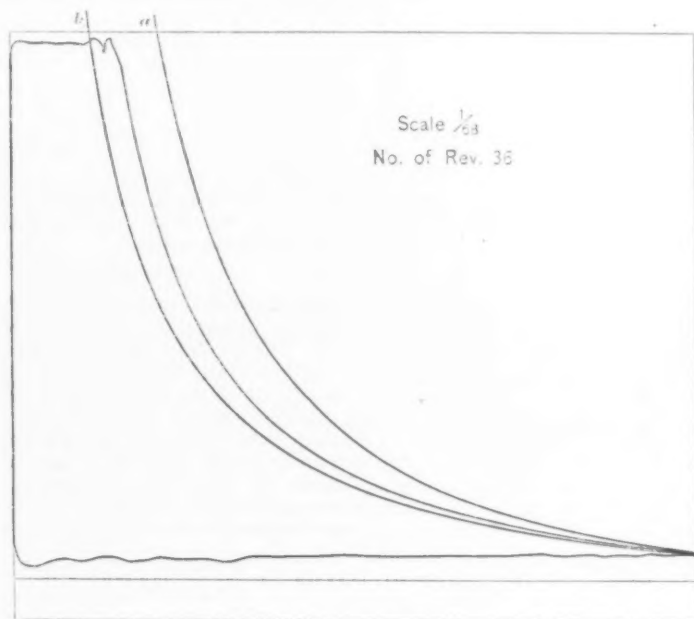


Fig. 6.—Diagram from a 12 x 24 inch Compressor Cylinder.

THE DE LA VERGNE REFRIGERATING MACHINE.

South Australia, but in time the American became a very formidable rival. In some localities where straw is regarded as being of little value the stripper is almost sure to be preferred; besides, harvesting with the stripper is generally admitted to be a very economical process, from there being only one loss instead of several, as in the different processes of binding, carting, stooking and threshing. In some districts of Australia the crops are so short and thin that they cannot very well be harvested with the reaper, and it is said that the practice of burning the straw on the field renders the land very fertile, an advantage which cannot be had when the reaper is used; but the reaper is becoming more popular, especially near the large cities and towns where straw is required, and is invariably used along the Goulburn and in the southeastern districts of Victoria. All the American binding and reaping machines that could be obtained in Victoria last year were purchased, and more of them would have been used had they been available.

We find in an English paper an illustration of a new fusible plug for steam boilers. The fusible metal is supplied in the form of a ring, into which is driven a plug of gun-metal. The fusible metal is thus between two good conductors, and is, therefore, admirably placed for prompt action; at the same time it is so far re-

arrangement of mirrors sighting can be accurately effected without necessitating an exposure of the party working the gun. At the trials three proof charges of 259 pounds of prismatic powder were fired, and afterward several rounds with a charge of 230 pounds of brown powder for the purpose of testing the range and the accuracy of fire. The projectile weighs 500 pounds, and an initial velocity of 1960 feet per second was obtained. The Elswick carriage worked smoothly and well, the gun, which weighs 30 tons, and has a caliber of 10 inches, being raised into firing position in from 18 to 20 seconds. A careful examination of the carriage after the completion of the tests discovered no signs of injury nor weakness. The Elswick firm are at present engaged in manufacturing some 68-ton guns to be mounted in a similar way.

The latest of the Southern furnaces, the construction of which has been decided upon, is that of the W. B. Wood Furnace Company, at Alabama, built from the designs of the manager, J. M. W. Norton. The general plan shows the casthouse, 130 x 50 feet, in front of the furnace, with the stockhouse, 200 x 80 feet, placed back of it at such a distance from the furnace that there is room between it and the latter for the three hot-blast stoves on the right side of the center line and for the engine-house,

conditions of industrial life. We have never underrated education of any description, but believe men of the old practical school were more likely to be successful generals of industry than some of the younger generations of business men, who have given most of their time to acquiring a knowledge of the dead languages. The best educational method for a great manufacturing country like Great Britain is to train the young men on lines that will enable them to best manage the practical needs of our trades, and get rid of the Old World ideas that the study of the dead languages is the best of all education for any young man, whatever may be his future course in life."

World's Fairs.

The year 1888 opens with a full assortment of international exhibitions, each claiming the attention of American manufacturers and inventors. It is becoming a recognized fact in Europe that no so-called "world's exhibition" approaches completeness unless the United States of America are represented in the display. American inventors are too prolific, and American manufacturers too enterprising, to be ignored in any exhibit purporting to be cosmopolitan in its character. As this change in the public sentiment of Europe has come about within less than half a century the significant truth thus conveyed is not the least among the indications of the world's industrial development. Americans are just now called upon to note the preparations for international exhibitions of the products of industry which are announced to take place in France, Belgium, Australia and Spain. The latter may well be considered first in the series, as the forthcoming exhibition at Barcelona will close about the time that the French exhibition opens, making it possible to send objects direct from one to the other. The Spanish delegate to the United States is E. M. Blum, Kemble Building, New York, who will give any needed information. The fair at Barcelona, one of the finest ports in Spain and a city offering many attractions, will continue six or eight months. The fact that the coming exhibition is the first ever held in Spain, together with the known advance in Spanish enlightenment in the last few years and the consequent rapidly increasing demand for improved machinery and agricultural implements, makes the fair an especially attractive one for American manufacturers.

Respecting the international exhibition to be held in Paris in 1889, a formal invitation to the United States has been extended through the French minister at Washington, and has been cordially indorsed by President Cleveland and the Secretary of State. Mr. Bayard recommends the appointment of a commission. Belgium's great international exhibition and convention, to be held in Brussels in May next, is another object to which the attention of Americans is invited. As special inducements have been offered to manufacturers in the United States, the agents of the exhibition, Armstrong, Kaner & Co., of this city, are expecting there will be at least a fair representation from this country. The scheme originated with the House of Representatives of Belgium and promptly received the royal sanction. The circular issued says: "The great advantage this exhibition offers to American manufacturers and producers, especially those of machinery, implements, tools, hardware and all articles of merit, is an opportunity which every enterprising manufacturer and producer in the United States should immediately avail himself of by introducing his goods abroad, and thereby creating a demand for the use of the same in foreign

countries. All goods must be in their respective order by April 25, 1888."

For many reasons American manufacturers have classed their export trade to Australia as the most valuable and as that which it is most desirable to push. With the quicker appreciation of labor-saving devices and with tastes developed in a direction more closely like our own, the Anglo-Saxon race of the antipodes have taken most kindly to our manufactures. Being a new country whose development is following lines in which we have pushed forward, Americans are far better able to understand and meet the wants of the Australian trade than even the mother country, hampered as it is with the obstinate conservatism of its manufacturers. An important advantage, too, to American manufacturers in the introduction of their goods is the fact that they are dealing with an English-speaking race whose methods of doing business are very much like ours. According to the report of Consul G. W. Griffin, at Sydney, the total value of the imports of Australia for the year ending June 30, 1886, was \$10,981,915, while the exports of the colonies to the United States were \$3,859,360. During the past few years the Germans have been making supreme efforts to obtain a foothold in the colonies, and we observe in the trade press of Germany that the manufacturers of that country are looking forward to the Melbourne exhibition to materially aid them in their plans. It would appear the part of wisdom on the part of those American manufacturers who already hold or are anxious to obtain Australian trade, to secure a proper representative at the Melbourne International Exhibition of this year to be opened on August 1, 1888, and to be kept open for six months. Applications for space should be made prior to the close of this month, Mr. J. T. Sheehan being agent in charge of American exhibitors. No charge will be made for space, but power will be reserved by the executive committee to reduce the space allotted at any time. The agent-general for Victoria has offices at 8 Victoria Mansion, Westminster, London, the secretary of the London committee being J. Cashel Hoey, while the secretary at Melbourne is G. T. A. Lavater.

From Mayor Hewitt's message it appears that the total indebtedness of New York City at the close of the year, including revenue bonds, was \$132,823,066, against \$131,601,103 due December 31, 1886. The net increase of the public debt for the year, therefore, amounts to \$1,221,962. Of the total amount \$38,604,066 was held by the sinking fund. The credit of the city stands deservedly high. Bonds issued in every instance have commanded a premium, in some instances as high as 4½ per cent. Total receipts for the year on all accounts, including balance in treasury December 31, 1886, \$75,977,836; total expenditures, \$67,900,425; balance in the treasury, \$8,077,411. The actual sum to be raised by taxation in 1888 is \$33,800,000, against \$31,843,022.55 in 1887. Actual increase in taxation, \$1,956,977.45.

Lemuel J. Curtis, one of the wealthiest and most prominent citizens of Meriden, Conn., died last week of heart troubles, aged 75 years. He was a director and stockholder in nearly every manufacturing company in the city.

The famous Great Eastern steamship, which is now lying in the Clyde, Scotland, has been purchased from the first mortgagee by a well-known firm of metal brokers. It is understood that the huge hulk is to be broken up, the cost of which operation is estimated to be from \$50,000 to \$75,000. The cost of purchase was \$82,500.

Purification of Feed-Water.

The importance is again being urged of ascertaining how far mechanical or chemical means may be applied economically to the purification of feed-water for boilers. The subject has been given special prominence by the difficulties experienced by some of the railroads from the destructive agencies of impure water in their locomotive boilers, notably the Atchison, Topeka and Santa Fé road. Within the past 10 or 15 years all sorts of compounds have been tried which were recommended to physic the scale-forming ingredients out of the water; various mechanical contrivances devised for the purpose of separating the lime salts were given tedious trials. Electricity had its turn, and there were few schemes or nostrums, absurd or rational, that promised to make feed-water better which did not receive more or less application in locomotive service, owing to the special interest taken in the subject by the Railway Master Mechanics' Association. The final conclusion reached, however, was that the only practicable way to escape the expense and trouble arising from the effects of hard water on boilers was to select soft water and to exercise particular care in the washing out of boilers. Though no doubt a fairly sensible decision, there are, unfortunately, times and places where it is not applicable. A committee has accordingly been appointed by the above association to investigate the subject further and to report at the next meeting.

The Concealment of Torpedo-Boats.

One well-known drawback in torpedo-boats is the visibility of the flame and smoke when within a distance of 2500 to 3000 yards of the object to be attacked. Experiments at the Rochefort Arsenal and on the Seine, France, with an apparatus invented by an engineer of the name of Oriollo, of Nantes, as is reported, have demonstrated that his arrangement is capable at night of quite obscuring the torpedo-boat. The flame and sparks disappear, the smoke, which is reduced in temperature from 100° to 30° or 40°, spreads itself out in a horizontal layer over the surface of the water, becomes inhalable and envelops the boat in an impenetrable vapor, which defies the electric search-light to discover the boat. A notable point in the application of the arrangement is that it in no way whatever interferes with the proper working of the engines or the boat. The steam pressure and the speed remain undiminished; the improvement is confined exclusively to the funnel, and the extra weight which it adds to the boat is insignificant. It is reported that France is engaged in applying this improvement, and that Spain and Italy will probably shortly introduce it to their navies.

Some work on the combustion of weighed amounts of hydrogen and atomic weight of oxygen is described by E. H. Keiser in the *Journal of the British Chemical Society*. Palladium was weighed with and without occluded hydrogen; it was then heated, and the hydrogen thus expelled passed over heated copper oxide. The water which was formed was also weighed; 1.5935 grams of hydrogen—from three experiments—gave 14.23972 grams of water. The atomic weight of oxygen calculated from these numbers is 15.872. The number obtained from Stas's figures is 15.84. Mr. Keiser intends repeating the experiments with large amounts of palladium.

Recent experiments have shown that a copper pipe may be overheated or even burnt in the process of brazing, and still the properties of the material be restored after it has cooled.

The Manufacture of Tin Plates.

BY W. STERCKEN.

(Continued from December 29, 1887, page 35.)

As early as 1843, Morewood & Rogers endeavored to supplant the square tinning hearth by semicircular vessels, taking out

the upper one being driven by gearing, while a counter-weight presses it against the lower roll. The latter dips into the tin to the extent of about one-half of its section, while the level of grease is kept a little above the line of contact of the two rolls. The plates are carried in along the guide D. These pots have the great advantage that they make the manufacturer

introduced it in their own works for thin plates, and also into a number of other English establishments. As they are now constructed the design is as follows, illustrated in the accompanying engraving, Fig. 44: The pot, which is about 6 feet long and 3 feet wide, is divided by an inset, A, into two sections, a bulge in the bottom of the pot making their connec-

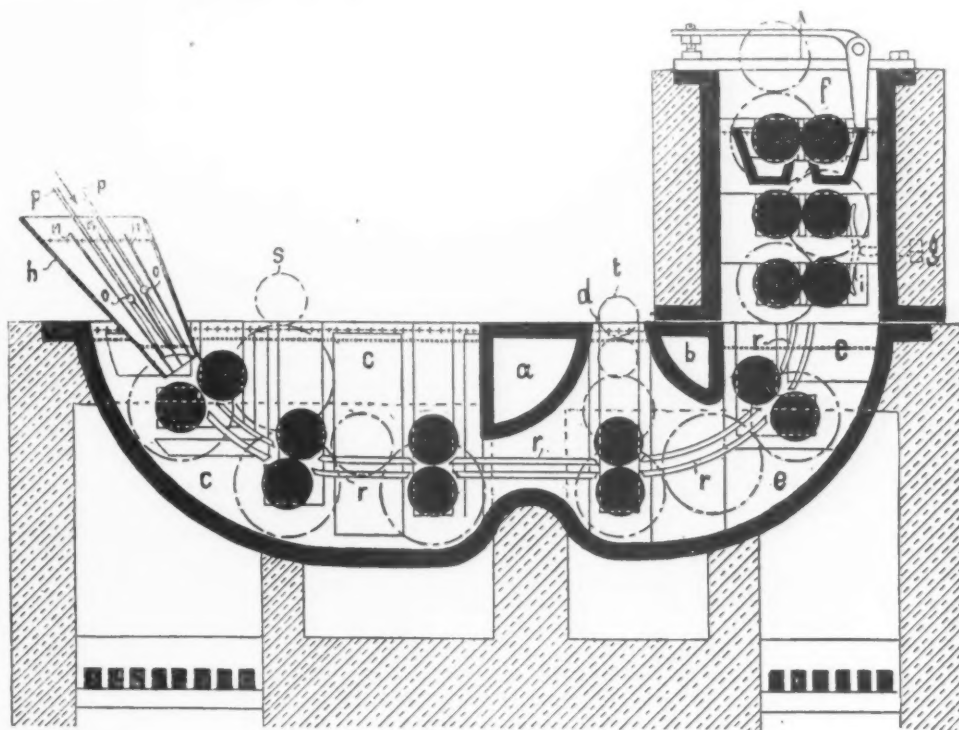


Fig. 44.—The Morewood & Rogers Tinning Pot.

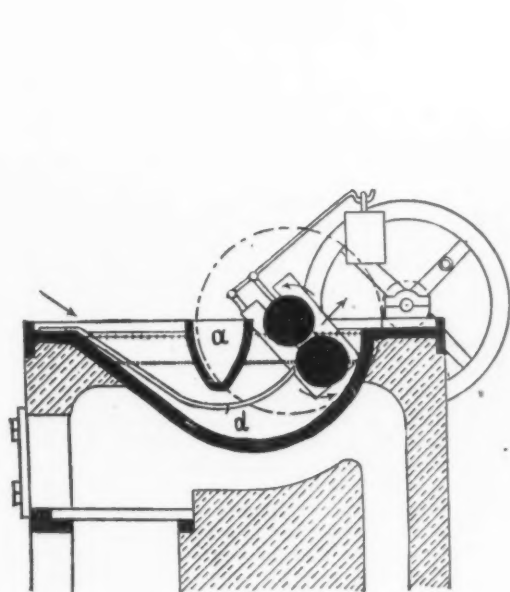


Fig. 43.—The Girard Tinning Pot.

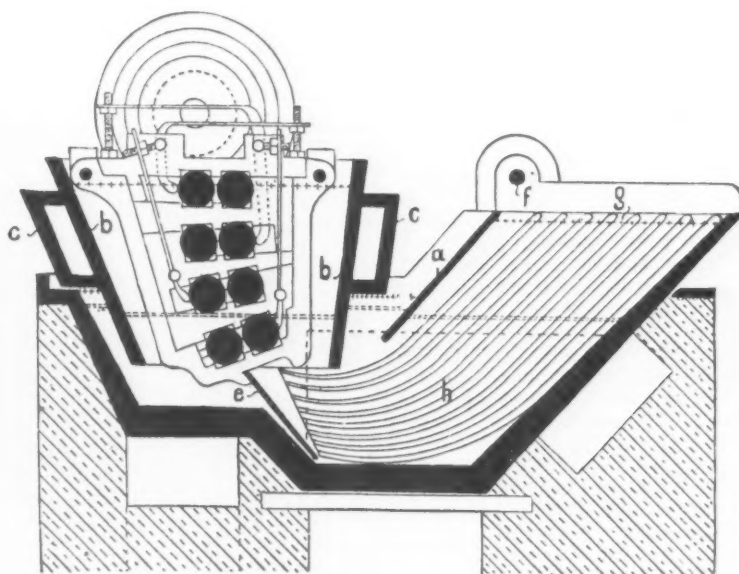


Fig. 45.—Tinning Pot at the Duffryn Works.

THE MANUFACTURE OF TIN PLATES.

patents in that and subsequent years. They were followed by Girard, whose pot was experimentally used in Germany in 1867 and was shown at the Paris exhibition of 1879. The accompanying illustration, Fig. 43, shows its construction. As will be seen, there is a curved bottom and a trough, A, which is used for dividing the pot into two sections, the surface of the tin in the left-hand section being covered with chloride of zinc, while the right-hand section is covered with grease. The two rolls are journaled at the sides of the pot,

independent of manual labor, and that the entire surface of the plates remains in the bath of tin an equal length of time, which is dependent upon the velocity of the rolls. The main trouble which has prevented their general introduction has been the impossibility of producing clean surfaces. But they can be used for tinning thin sheets, plates of heavier gauges taking unduly long pots and a greater number of rolls.

This type of hearth has been further developed by Morewood & Rogers, who have

tion a narrow one. Both divisions have their own fireplace. The fireplace on the right-hand side is only used for a short time, when the hearth is started. When the metal is brought to the right temperature by firing in both fireplaces the left-hand grate only is charged, so that it is kept at a higher temperature than the other section. In order to regulate the temperature cold air is allowed to pass through the passages A and B. There are five sets of rolls in the main tinning pot revolving at equal speed. The ribs R

are used as guides for carrying plates from one set of rolls to the other. They are driven by the gears S. The grease funnel H, which has only a narrow lower opening in order to avoid high heating of its contents, is filled with a mixture of 67 parts of rosin, 23 parts of tallow and 10 parts of palm oil. In this funnel three solid guides, N, are arranged, between which are two feathering guides, P. Between each of the latter and the stationary guides N a plate is introduced, and they are allowed to go into the bath of tin in regulated succession by slightly pressing the guides so that the lower ends of them allow the plate to fall. As soon as one section is emptied a fresh plate is put into it. By this arrangement the plates remain in the heated grease a longer time and are thus given an opportunity to dry and to preheat. The rolling pot F contains three sets of rolls, the upper set being placed in troughs filled with the purest tin. The plates are tinned in the left section, highly heated, and then enter the right division, where any particles of tin oxide have an opportunity to rise, and are kept from entering the rolling pot F by the surface of the channel B. In the rolling pot the thickness of the coating is regulated by the two lower sets of rolls, while the bright tin surface is given to the plate in the highest set of rolls. They would undoubtedly furnish good plates if it were not for the fact that the process does not include brushing, and therefore leads to a rapid accumulation of oxide of tin, soon rendering the bath of metal impure. It is stated that Morewood has made the most determined efforts to overcome this drawback. The oxide becomes particularly troublesome when it accumulates on the surface of the tin in the rolling pot F. Morewood has, therefore, proposed to provide the rolling pot F with a lateral chamber, the bottom of which is somewhat below the surface of the metal in the main pot. While the head of this chamber slides in grooves when the main pot is so filled with tin that the latter flows into the lateral chamber, it carries with it the oxide floating on it, and this can be removed by lifting the slide. In one English works an apparatus similar to that of Morewood is used for makingterne plates, the rolls, however, being supplanted by solid guides in which the position of two successive plates is such as to form a cross in section. It is stated that this machine operates with a certainty in the absence of rolls.

At the Duffryn works, near Swansea, a number of machines are used in which the plates also travel in one direction through one tinning pot, but in which they remain longer in the tin, although the pot is not larger than usual, and without sacrificing the advantage of an uninterrupted rolling. This machine is shown in Fig. 45. As will be seen, it has a tin pot, the upper part of which is divided in two sections by the wall A. In the left-hand section there is a grease funnel, B, with four sets of smoothing rolls. In order to be able to heat the grease in it more highly, or to cool it if necessary, the flue C is carried around three sides of the funnel, so that either cold air or hot gases may be passed through it. At the lower part of the rolls is an inclined wall, E, reaching down to near the bottom of the pot. In the right-hand section, into which the plates are introduced, are two vertical castings, G, arranged to carry a series of guides, H. The pot is filled with tin until its surface lies slightly above the side of the rolls, the balance being filled with palm oil. When the bath has reached the requisite temperature the plate is introduced between the guides H and is pushed forward to the wall E. Then it rests entirely in the tin. Thus seven plates are pushed under the surface of the metal, and when they are all in position the first is moved further until it

is brought between the last set of rolls. As soon as room has been found for it a new plate is introduced, the second, third, fourth and fifth following in succession. This pot is either used alone, so that the plates are finished in a single operation, or in order to produce a better quality of plates it is arranged in one hearth, together with a rolling pot. In one case the number of guides is reduced to four. The main trouble with this machine is to keep the tin and the grease at the right temperature. A large number of other plans, similar in character, have been patented in England, but few of them have found any application in practice. Experience has shown, however, that plates tinned in these machines have a stronger coating than those which are produced in machines in which the plates occupy a vertical position.

Early Large Timber Rafts.

In an article entitled "The Nova Scotia Raft and Its Progenitors," the *Timber Trades Journal* refers in the following interesting manner to early large timber rafts:

In 1792 a raft containing about 1000 tons of timber was built at Swan Island, in the Kennebec, by Dr. Tupper, a somewhat noted eccentric character. It was made by tree-nailing square timber together in the form of a ship's hull, and was ship-rigged, the intention being to send her across to England. At that time no manufactured lumber was admitted to the ports of Great Britain; hence the timber in the raft was simply squared with the axe, to make it stow well. The ship or raft lay at Bath for some time, it being difficult to get men to go in her. She finally went to sea, however, carrying a small vessel on her deck. But off the Labrador coast her crew became frightened by bad weather and abandoned her. She was afterward boarded by men from a passing vessel and found to be in good order, and it was suspected that she was deserted without sufficient cause. Two other similar attempts were made from the Kennebec, and both vessels went safely across, but foundered on the English coast, under the same suspicions of fraud as in the case of the Tupper ship. In 1825 the ship Baron of Renfrew was launched at Quebec, having made a previous unsuccessful attempt, when stopped on her way, owing to the grease being consumed by fire from friction. She was towed down to the Island of Orleans and anchored. Her dimensions are given as follows: Length, 309 feet; breadth, 60 feet; depth, 38 internally and 57 externally; tonnage, 5888 tons; draft when launched, 24 feet; cargo on board when launched, 4000 tons of timber. She was ship-rigged, with four masts, and was perfectly flat-bottom, with a keel of about 12 inches, wall-sided, sharp forward and rather lean aft, and looked more like a block of buildings than a ship. She sailed in August, 1825, drawing 36 feet of water, in command of a Scotchman, a half-pay lieutenant in the British navy. October 27 the Baron of Renfrew drove on shore on the coast of France, near Calais, and went to pieces.

This week the American Society of Civil Engineers holds its 35th annual meeting in this city. Wednesday evening Lieutenant C. C. Rogers, U. S. N., read a paper on the Panama Canal in 1887. Thursday a visit will be made to the Harlem River Bridge, to be followed in the evening by a reception.

Important changes in the management of the works of the Cambria Iron Company, at Johnstown, Pa., were made early in the year. The resignation of Philip E. Chapin, general manager, which had been tendered the company two months before, took

effect on that day, and John Fulton assumed the duties of that important position, being advanced from his former position as general superintendent. James J. Fronheiser was promoted to fill the vacancy left by Mr. Fulton's advancement, and is now general superintendent. Charles S. Price, formerly in charge of the steel works, was made superintendent of the metallurgical department, embracing both the blast furnaces and the steel works, which is the position formerly filled by Mr. Fronheiser. Mr. Chapin retires with the best wishes of his associates and subordinates, and although he has had tempting inducements from various quarters to form new business connections, since it became known that he proposed to sever his official connection with the Cambria Iron Company, he will for the present enjoy a season of rest. The officers who have been promoted in consequence of Mr. Chapin's retirement are thoroughly qualified by attainments and experience for the duties of their new positions, and in addition they have been in the service of the Company for many years, and are necessarily familiar with the plant, methods and policy. Under their management continued progress is assured.

The Origin of Petroleum.—Professor Medeleef has advanced the theory that petroleum is of mineral origin, and that its production is going on, and may continue almost indefinitely. He has succeeded in making it artificially by a similar process to that which he believes is going on in the earth, and experts find it impossible to distinguish between the natural and the manufactured article. His hypothesis is that water finds its way below the crust of the earth and then meets with carbides of metals, particularly of iron, in a glowing state. The water is decomposed into its constituent gases; the oxygen unites with the iron, while the hydrogen takes up the carbon, and ascends to a higher region where part of it is condensed into mineral oil, and part remains as natural gas, to escape where it can find an outlet, or to remain stored at great pressure until a borehole is put down to provide it a passage to the surface. Oil-bearing strata occur in the vicinity of mountain ranges, and it is supposed that the upheaval of the hills has dislocated the strata below sufficiently to give the water access to depths from which it is ordinarily shut out. If the center of the earth contains large amounts of metallic carbides, we have in prospect a store of fuel against the days when our coal will be exhausted.

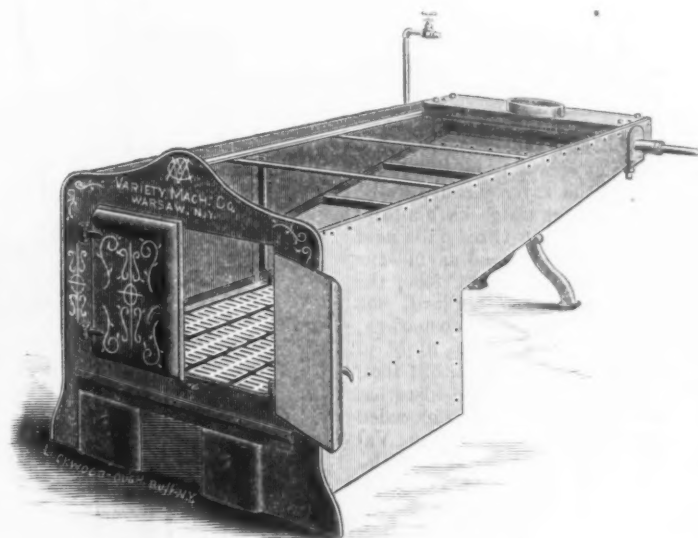
The East Chicago manufacturing settlement, at and near Hammond, Ind., is proceeding under very encouraging circumstances. The latest project which has materialized there is the Brown's Seamless Construction Company, composed of practical manufacturers, who have purchased 50 acres of land for a site for their works. They have a capital of \$600,000, and propose to erect steel works and manufacture seamless steel tubes, cylinders and boilers. These products will be manufactured under a patented process controlled by them, which they claim has been shown to be a mechanical success at Pittsburgh. The Chicago and Calumet Terminal Railway, connecting with the railroads centering at Chicago, has been completed half way through the property of the improvement company owning East Chicago. A number of manufacturing enterprises, for which sites had previously been secured, have been waiting for the construction of this railroad before they began to build. Among the improvements actually begun at Hammond is a large brick hotel, to contain over 100 rooms, which is to be completed early in the summer, being badly needed

for the accommodation of persons interested in the construction of new works. Boring for natural gas is being continued, the officers of the improvement company feeling sanguine of securing a supply of the cheap fuel if they persevere in their search for it.

Iron Arch for Sugar-Makers.

Sugar-makers will be interested in the new iron arch which we illustrate on this page and which is made by the Variety Machine company, of Warsaw, N. Y.

The engraving shows the arch complete (except brick for side walls), ready for a regular pan 6 feet 11 inches long and 2 feet 10½ inches wide. It is made of heavy sheet and angle iron, with cast front, all strongly bolted and riveted together. The fire doors have an opening of 16 x 24 inches, and the ash doors 6 x 16 inches. The grates are 24 inches wide and 32 inches long, and have a heavy cast fire-back. The heater is placed back of the



IRON ARCH FOR SUGAR MAKERS.

Made by the Variety Machine Company, Warsaw, N. Y.

pan and directly under the smoke-pipe, so utilizing the heat after leaving the pan and delivering the sap into the pan at the boiling point. This heater is made of 2-inch pipe, reduced to ½ inch outside of the arch, to be connected with the storing tank by rubber hose, the whole to be drawn from the arch when boiling down to syrup. The arch, we are told, has been thoroughly tested during the past season and has given very satisfactory results. It is claimed to save one-third of the fuel used in the old style brick and stone arches, besides being as neat and clean as a kitchen range.

The evidence given at the recent inquiry into the cause of the explosion of the copper steam-pipe on board the English steamer Elbe, which occurred a short time ago, and the experiments made during the course of the investigation, clearly point to the fact that an element of danger exists in the present practice of brazing large heavy copper pipes intended to be subjected to such high pressures as are now so common. It is generally admitted that welds or brazed joints in any material must possess certain elements of uncertainty, and in the case of copper worked over a fire these elements of uncertainty, as the above tests show, are greatly increased and should be eliminated.

The Edes, Mixer & Heald Zinc Company, of Knoxville, Tenn., expect to erect two more spelter furnaces during the year 1888.

The Interstate Commerce Law.—II.

UNDUE PREFERENCES.

Section 3 provides that no undue preference shall be given to any particular person, trade or locality. This, with the provision in section 1 that all rates shall be reasonable, is but a condensed expression of the common law, with, however, new machinery for enforcing it, and is almost word for word the same as the English law of 1854, while this is in turn a repetition of the law of 1843. So long ago was the abstract principle of equal treatment for all recognized. The application of this principle is beset with difficulties. There is and there can be no mathematical rule by which cases in dispute can be measured, and, what is more, neither can there be any but a relative moral standard. It is largely a question of governmental and commercial expediency, not abstract honesty. We have recently discussed in our columns some of the perplexing questions arising as to preferences between

Commission. At present one of the most interesting fields for the study of this question is that included in and lying immediately around the State of Nebraska. The race for the supremacy between the growing cities—the prize being the control of the wholesale trade for the future—is equalled only by the rivalry in their extensions of the great railway lines for the carriage of this future traffic.

LONG AND SHORT Haul.

Our readers are familiar with our position upon the general question of the long and short haul. We hold that as a general principle the prohibition of a greater charge for a shorter distance is just, but should be made subject to exceptions under certain circumstances. Too much credit cannot be given to the commission for their wise rulings under this section. Water competition should constitute such an exception where the conditions will not allow the railroad to reduce the inland rates to the competitive basis. Of these conditions, such as honest capitalization (both in stock and bonds), the commission must judge according to each individual case. Competition with foreign railways who are not subject to the act should also rightly be such an exception. In the law the commissioners are empowered to judge of the facts and permit infractions of the general principle. Senator Reagan, whose ultra position is well known, has introduced an amendment which would make the rule hard and fast, also specifically stating that water competition shall not constitute different circumstances and conditions.

A more difficult question is how far competition between one railroad and another should justify violations of the rule upon the part of the weaker road. Plainly this could not be generally acknowledged, since in that case the section would have no meaning, because all rates are in a sense competitive, and yet cases of apparent hardship may arise if the rule is made imperative. In several cases the New York State Board of Railroad Commissioners have recorded their opinion that where two roads compete at the crossing (the New York Central and the Ontario for example), and the rate of the strong road must be met by the weak, the latter may charge a higher rate from a shorter distance if necessary to earn operating expenses and a fair return upon capital really paid in. It should always be remembered that it is private and not public money which was put into this weaker road, and that, too, under a general railroad act. It may be legal, but it is not just, for a State afterwards to pass a law which shall cause a loss to these investors, without at the same time providing some means for reimbursing them. On the other hand, there should be reason in all things, and reason in judging when one railway is entitled to compete with another. In the Central Vermont case, the Interstate Commission truly say that the railroads running from New York to New Orleans might compete for St. Paul traffic if all kinds of competition regardless of distance were considered legitimate and their decision was that the local rates on the road in question must not exceed the through rates to Detroit. Within what limits of longer distance, then, is competition fair? This has never been put down in figures in America, but in parts of Europe, where pooling is reduced to a mathematical basis, a railroad which is longer than another between two points, by more than 25 per cent. is not considered entitled to keep more than its operating expenses, but must give up the profit of such traffic. Under this system, for example, considering the distance between New York and Chicago as 1000 miles, a railroad running a roundabout course of much over 1250 miles between these cities would under a pool be unable to share in any profits of

localities. Preferences between trades or between different parts of the same trade are equally forbidden, yet the line of distinction drawn in our tariffs may be but a faint one. The recently promulgated list of iron articles, although containing most of the staple goods, is not a complete enumeration of the iron manufactures, the reduced rate being limited to the articles named. The railroad managers have no doubt tried to be fair about the selection, and yet there must be disappointment among manufacturers and merchants who find their special goods not included. The natural question will be, Why are they not, or, at least, why are they not granted some corresponding favor?

Another perplexing matter arising under this section is the strife of towns to become centers for the distribution of trade; in other words, wholesale or jobbing centers. Before the passage of the law the power of the railroad manager in this respect was autocratic and in the Western States was often used for or against special places. It was almost an axiom that there should be a trade center every 300 or 500 miles in thinly settled, but growing sections, and that the determination of such a commercial center was the prerogative of the freight manager. While the matter does not now assume this shape, still preferential rates are such powerful factors in the problem of securing a large jobbing trade that we find constant complaints and demands addressed to the friendly railroad managers and to the Interstate

such a pool. This percentage of restriction of competition is too small for our larger country, but will serve as a basis for discussion. The Minneapolis and St. Louis Railway, who have defaulted on the interest of their bonds, in a recent letter throw the responsibility upon the Minnesota Railroad commissioners, who compelled a rigid observance of the short-haul rule. The company give Red Wing as an instance. This place is on the direct line of the C., M. and St. P. from St. Paul, but is reached by the M. and St. L. over a branch, these lines forming a triangle. The M. and St. L. were not allowed to meet the C., M. and St. P. rates at Red Wing without a reduction of all their local rates on their roundabout route. The charge of the company throws a grave responsibility upon the Minnesota board, which will doubtless cause a careful investigation of the situation. Without full particulars no opinion can be expressed, but the case throws a side light upon the probable outcome of such a rigid law as Judge Reagan proposes were it to be incorporated into our Interstate act.

Naval Reserves.

The Secretary of the Navy in his recent report refers as follows to naval reserves:

The policy of this country has always been opposed to the establishment of large permanent naval and military organizations. This policy for a country with a great coast line and important commercial interests almost necessitates the maintenance of auxiliaries in the way of naval and military reserves. The land forces have such auxiliaries in the shape of State militia or national guards. These constitute large bodies of troops, well organized and equipped, thoroughly well trained and disciplined, ready to take the field and to become a part of a regular military establishment when required. A public feeling seems to exist for the creation of a naval reserve. Committees of the chambers of commerce of New York and San Francisco have passed resolutions urging the organization of such a force as a means for providing for the coast defense and meeting the increased demands of the regular naval establishment for men and vessels upon the outbreak of war. Inquiries have also been made at the Department from cities of the Great Lakes, and meetings have been held in cities of the South endorsing the formation of such a national organization. The Department has informed itself fully of the different systems of organization for coast defense and naval reserves at present in force in foreign countries, and is prepared to formulate a general plan for a similar organization to meet the requirements and conditions of our own institutions. It should resemble in organization that of the militia or national guard, rest upon the foundation of local interest, contemplate the employment and rapid mobilization of steamers enrolled on an auxiliary navy list, and be calculated to produce the best results upon a comparatively small national expenditure. I ask for this question the earnest consideration of Congress.

It may not be out of place as a branch of this subject to call attention to one of the incidental consequences of the policy pursued by other countries in this matter of a naval reserve. In time of war troop-ships or transports are in demand. Several European governments make an annual contribution, based on tonnage, to companies constructing new vessels. The consideration to the government is a counter-agreement permitting the government to take such a vessel for a transport in time of war upon terms named in the agreement. The government officials are also consulted as to her mode of construction, and she

goes on to the naval reserve list. These payments are incidentally in the nature of a subsidy to the shipowner, and this, with the liberal payments for government transportation of mails, &c., keeps a large fleet of merchantmen afloat as a reserve ready for a time of war. Without ships and trained seamen there can be no naval reserve. A notable illustration of the generosity and courage with which England pushes her shipping interest is seen in the manner in which she is at this moment dealing with the trade of the Northern Pacific. It has been thus far principally under the American flag and contributory to San Francisco and the United States. The British Government and Canada together are proposing for the establishment of a line of first-class steamers from Vancouver to Japan. The subsidy is likely to be \$300,000 annually—£45,000 from England and £15,000 from Canada. There will also be contributed from the naval reserve fund probably \$5 per ton annually for each ship constructed for the route, which will increase the sum by probably \$125,000. Under such competition it is quite easy to conjecture what will become of the American flag and our resources in the way of a naval reserve in the North Pacific.

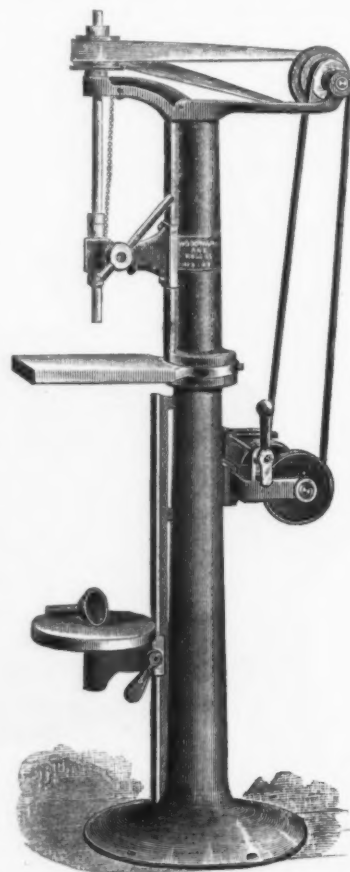
The World's Big Waterfalls.—According to a recent compilation the highest waterfalls are the three Krimbs Falls, in the upper Prinzgau, which have a total height of 1148 feet. The three falls next in height are found in Scandinavia—the Verne Foss, in Romsdal, 984 feet; the Vettis Foss, on the Sogne Fjord, 853 feet; the Rjukan Foss, in Telemarken, 804 feet. With a decrease in height of 213 feet, the three Velino Falls, 591 feet, near Zerni, the birthplace of the historian Tacitus, follow next, and are succeeded by the three Tessa falls, in the Val Formazza, 541 feet. The Gastein Falls, in the Gastein Valley, 469 feet, are midway between the Skjaggedal Foss, in the Hardanger Fjord, 424 feet, and the Boring Foss, in the same fjord. The great Anio cascade, near Tivoli, 315 feet, appears small by the side of the foregoing, but is still larger than the falls of the Elbe in the Riesengebirge, which are only 148 feet high. If the width of the falls is taken into consideration the most imposing are those of the Victoria Falls of the Zambezi, which are 394 feet high, by a width of 8200 feet. A long way behind come the Niagara Falls, 177 feet high and 1968 feet wide. The third largest fall is that of the Rhine at Schaffhausen, 148 feet wide, by only 33 feet high. The highest waterfalls mentioned cannot compare with those gigantic falls as regards cubic contents.

From December 7 to the 9th of January 6,266,000 pounds of copper have been shipped from Houghton over the D., S. S. and A. Railroad to New England and Atlantic seaboard points. It was all sent by way of St. Ignace, being transferred by the ferry across the Straits to connecting lines.

The stock of the Lake Superior Iron Company, incorporated under the mining and manufacturing laws of Michigan, February, 1853, renewed 1882, for the purpose of mining iron ore and marketing the same, has been listed at the Boston Stock Exchange. The company have paid dividends up to October 1st, 1887, \$3,120,000; capital, \$1,500,000; par value, \$25 and unassessable. Directors, Peter White, G. W. R. Matteson, G. Z. Silsbee, Joseph S. Fay, Jr., J. J. Storow, H. H. Fay, T. Jefferson Coolidge; president, J. J. Storow; treasurer and general manager, Joseph S. Fay, Jr.; secretary, A. C. Tenney.

New Upright Drill.

We show an engraving of a new upright drill intended for all kinds of accurate and light work up to $\frac{1}{2}$ -inch holes. The spindle is counterbalanced by a weight and is adjustable by moving the arm, which is gibbed to the front of the upright, having a traverse of 13 inches from the upper table. The throw of the spindle by the feed lever is $3\frac{1}{4}$ inches. The rack for moving the spindle is steel. The distance from the center of the spindle to the column is 6 inches. The upper table can be turned around the column when required to use the bell center for centering



New Upright Drill, Made by Woodward & Rogers, Hartford, Conn.

work, or the lower table. The lower table is 10 inches in diameter, and moves the entire length of the column, giving a distance of 46 inches between the table and spindle. The bell center fits into the same socket as the lower table. The tight and loose pulleys are $4\frac{1}{4} \times 1\frac{1}{2}$ inches. The speed for general work should be 350 revolutions. The cone has three changes of speed. The lower table moving the entire length of the column is very convenient, and gives the drill the same capacity for light work as a larger tool. The steel rack for moving the spindle gives a full bearing on the tooth and will not break as a cast-iron rack cut on the slide.

The weight of the tool is 250 pounds. Messrs. Woodward & Rogers, of Hartford, Conn., are the makers.

The Castle Garden annual report, recently submitted, shows the total immigration during the past year to have been 371,619 steerage and 78,792 cabin. These constituted 885 shiploads, or an average of about 500 to each vessel. The North German Lloyd is credited with 52,430 steerage and 12,505 cabin, which is nearly double the number brought by any other line. The Cunard Line had the largest number of first-class passengers, 15,300; in the steerage, 17,729.

NEW PUBLICATIONS.

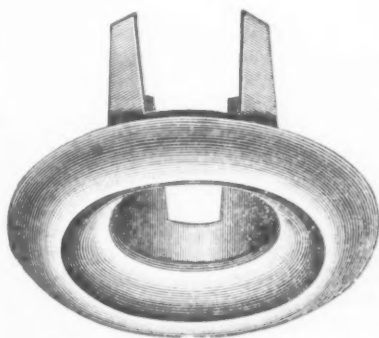
THE CITY OF LOUISVILLE AND A GLIMPSE OF KENTUCKY. Issued under the auspices of the Committee on Industrial and Commercial Improvement of the Board of Trade of Louisville. 156 pages, royal octavo, with wide margins.

We have received a copy of this volume with the compliments of the Commercial Club of Louisville. It is one of the most creditable pieces of work issued by a commercial body that has come to our notice. Of the contents, 70 pages are devoted to a presentation of the advantages of Louisville as a manufacturing and trade center, and the wealth of the natural resources of the State of Kentucky. The remaining pages are occupied with sketches of prominent commercial and manufacturing interests in Louisville. It is interspersed with well-executed illustrations of the buildings occupied by leading firms of Louisville, views of public institutions of the city and State, representations of charming bits of Kentucky scenery, and portraits of citizens who have distinguished themselves as leaders of commerce, masters of finance and captains of industry. The text bears evidences of having been prepared by writers of more than ordinary ability, who present the advantages of their city and State with consummate skill, clothing dry statistics with a graceful phraseology that charms the reader and claims his attention, and portraying the marvelous wealth of the natural resources of Kentucky in such a way as to excite wonder that their development has not been more thoroughly accomplished. The coal future of Louisville is admirably treated in a paper by Hon. J. Stoddard Johnston, which was read before the State Industrial and Commercial Conference in October, 1887, and which is here presented. He states that there are two coal fields in Kentucky—the Western, comprising about 4000 square miles, which lies about 70 miles southwest of Louisville, and the Eastern, comprising more than 10,000 square miles, or one-fourth the area of the State. The coal of the Western field is mainly a soft, bituminous, non-coking coal, with a limited area of cannel coal; while that of the Eastern field comprises cannel, coking and dry-burning coal of most excellent quality for either steam-raising, domestic or iron-smelting purposes. As yet the Eastern field is poorly supplied with transportation facilities, but this drawback to development is being overcome by railroads which are in course of construction through that section, although the improvement of the Kentucky River is advocated as a very important adjunct to the railroad system. Considering this subject Mr. Johnston says: "This leads me to remark, incidentally, that if the average talent which represents Kentucky in Congress could, for a brief period, descend from the lofty pinnacle of tariff abstractions to the humbler but more practical perch of State advancement in material development, we should not be so far behind our sister States in these essential particulars." The reports of Hon. John R. Proctor, State Geologist, are also drawn upon for information relative to the mineral resources of the State, particularly with reference to the southeastern section. A number of analyses of Elkhorn coal and coke are given, which show the excellent quality of that fuel, ranking among the best in the country. Attention is also paid to the matter of iron ore deposits, fire and pottery clays, cement, &c. In one important respect the work is disappointing. Among the notices of the business houses of Louisville and vicinity there appear but a few manufacturing establishments. B. F. Avery & Sons, the celebrated plow manufacturers, De Pauw's American Plate Glass Works, Dennis Long & Co., manufacturers of cast-iron pipe, the Turner, Day & Woolworth Mfg. Company,

makers of wooden handles, and a few cement, furniture and veneer works comprise the sum total of industrial concerns whose extent and achievements are set forth in the pages of the book. A good reason may exist for the meagerness of the showing in this respect, but there is certainly a wealth of material of this character in the city of Louisville to draw upon. As a specimen of typography and the book-makers' art this work is superb. The letter-press is faultless, the paper is highly calendered and of good weight, and the broad pages and wide margins are specially attractive. The designing, engraving, electrotyping and printing were executed by the *Courier-Journal* Job Printing Company, of Louisville.

Steam-Pipe Collars.

The Worcester Ferrule Company, at Worcester, Mass., manufacture several forms of steam-pipe collars, three of which



Steam-Pipe Collars.—Fig. 1.—Ceiling Flange No. 1.

are shown in the accompanying engravings. Figs. 1 and 2 illustrate ceiling flanges, while Fig. 3 shows the general appearance of the floor flange. The cylindrical part

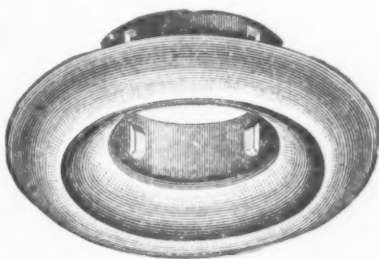


Fig. 2.—Ceiling Flange No. 2.

of the flanges which grasps the steam-pipe is made of tinned sheet iron of heavy gauge. This is soldered to a sheet brass face plate, finished in nickel. The ceiling

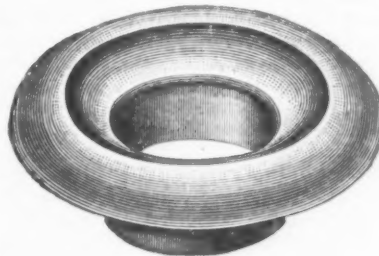


Fig. 3.—Floor Flange.

flange shown in Fig. 1 is held in place by the prongs being bent outward and clinched on the upper side of the ceiling. This can easily be done through the center opening in the face plate before the pipe is inserted in position. The ceiling flange shown in the second illustration is held to the pipe by

four truss-shaped springs which bear inwardly. By the construction of this flange it will be readily understood that the pipe can be inserted from either side. The floor flange, shown in Fig. 4, is like the No. 2 ceiling flange without the truss-shaped springs. These several forms of flanges are each made in sizes of $\frac{3}{4}$ inch to 2 inches, the intermediate sizes varying by $\frac{1}{4}$ inch and $\frac{1}{8}$ inch.

Compound High-Speed Box Engine.

—At one of the several recent English exhibitions was shown a compound high-speed box engine, having a 6-inch and a 9-inch cylinder and 6-inch stroke. The engine was coupled to a No. 1 Gulcher dynamo, which lighted a 3000-candle power arc lamp. The two cylinders are placed at opposite ends of a box-frame, and work on opposite cranks, so that the weights and pressures are balanced at all parts of the stroke. One valve works both the cylinders, and as it has a gyratory motion it has no tendency to cut or groove the valve face. The steam from the high-pressure cylinder passes through the valve on its way to the low-pressure cylinder, the valve being worked by an eccentric on the crankshaft. The internal working parts are constantly and automatically lubricated by dipping into a bath of oil.

The market reporters have taken pains to make the following comparison of the stocks now in hand in the United States, of the leading staples in trade compared with one year ago, showing a large decrease, and conjectures are indulged respecting the probable effect on market valuations should the active demand of the last few months continue without abatement:

	January 1. 1888.	January 1. 1887.
Wheat, visible supply, bushels.....	69,779,631	85,280,174
Corn, visible supply, bushels.....	9,625,159	16,528,598
Winter pork pack (to New Year), hogs.....	3,875,000	4,775,000
Lard, New York, tierces.....	19,932	33,770
Sugar, New York, bags.....	1,089,000	1,961,308
Coffee, world's supply, bags.....	349,557	632,247
Print cloths, pieces.....	199,000	155,000
Cotton, bales.....	1,054,707	1,118,884
Petroleum, gross stock, barrels.....	25,000,000	33,000,000
Coffee, U. S., pounds.....	30,000,000	35,000,000
Hides, New York, No. 1.....	336,900	353,606
Leaf tobacco, world, hhds.....	285,124	236,357
Leaf tobacco, U. S. hhds.....	182,537	139,265

Only two of these diverse articles show an increase, print cloths and leaf tobacco. Poor crops explain the loss in cereals and pork, diminished production and increased consumption in sugar, a bad crop in coffee, an unprecedented demand in cotton and restricted production in petroleum and copper.

The Institute of Technology, in Boston, has had a prosperous year. The growth of the college is shown by the fact that the College of Industrial Science, which is properly the Institute of Technology, has 83 more scholars than last year, or some 720 students in all. In addition there are about 100 more pupils in the School of Mechanic Arts and the Lowell Institute of Design, making a total of about 815 or 820 pupils. In another direction the growth of the school is shown by the addition, by vote of the faculty, of a course in chemical engineering.

It is a matter for congratulation that during the past year three manufactures necessary to the navy have been established in the United States—armor plate, forgings for heavy steel guns, and the Hotchkiss rapid fire gun.

THE WEEK.

The Arthur Kill Bridge is referred to by Governor Green in his message to the Legislature of New Jersey. When the title of the State to lands under the waters of Arthur Kill was assailed an injunction against the railroad corporation concerned was obtained from the Court of Chancery. The United States Circuit Court dissolved the injunction, and an appeal to the Supreme Court of the United States is pending.

The great rubber trust, now believed to be on the eve of consummation, and which comprises all but two of the largest manufacturers of rubber boots and shoes in the country, had a conference at the Windsor Hotel, in this city, on Saturday last. The basis of the trust was substantially agreed upon. Some idea of the magnitude of the projected combine may be formed from a glance at the statistics, which show the growth of the rubber industry in America. The importation of crude rubber has risen from 11,000,000 pounds a few years ago to 27,000,000 pounds in 1886, and to a very much larger amount in 1887. It is authoritatively stated that this industry to-day represents an investment of about \$50,000,000 and an annual trade of over \$100,000,000.

The report of the State Engineer and Surveyor of New York shows that the total amount of freight moved on the canals during the season of navigation just closed was 5,553,895 tons, and this increased volume of business has been done with less detention than ever before. The most important improvements during the year consisted in the doubling the length of the lock-chambers in several instances, so as to admit the boats coupled on behind the other, to accommodate the system now nearly universal on the Erie Canal, of towing boats in pairs.

A report from Boston says that a scheme is on foot for the consolidation of all the gas companies in that city. Samuel Little is said to be chairman of the syndicate who have a capital of \$5,000,000. Capitalists in New York and Philadelphia are interested.

The Interstate Commerce Commission rendered a decision in the case of Thomas J. Reynolds, of Corydon, Penn., against the Western New York and Pennsylvania Railroad Company, alleging extortionate rates on railroad ties. The Commission orders that the railroad company desist from charging a greater price for the transportation of ties from points in Pennsylvania to Salamanca and Olean, New York, than is charged for the transportation of lumber between the same points.

A review of the building material market in New York for the last year shows that there were increased supplies, somewhat fuller values and a healthy condition of trade up to about September, when business suddenly fell away. At present the number of finished structures is supposed to be in excess, and contractors hesitate on account of the uncertainties of labor.

The reduction of the through export rates from Chicago recently is said by railroad men to have no significance. The reduction is made to conform to lower ocean transportation rates, which fluctuate considerably.

The first regular shipment of tin ore has arrived at Minneapolis from the Black Hills country via the Chicago and Northwestern Railroad. A steady freighting business from the mines is promised from this date.

A steamer will leave this port for Odessa, Russia, about the middle of February, laden with agricultural implements. She is dispatched by the firm of Herbert Bar-

bour & Co. Pertinent to this fact it may be stated that the Russian Minister of Finance announces a more pacific policy, and says the obstacles to agriculture, commerce and industry must be removed.

The Cotton, Produce, and Stock Exchanges agree in demanding the repeal of the half-holiday law, as being detrimental to their interests.

A new railroad, to extend from South Amboy to the Lehigh Valley and Jersey Central Railroad at Bound Brook will be an important coal feeder to New York City. It will run through New Brunswick. The Lackawanna Steel Company have agreed under the contract to deliver 500 tons of rails by February 1.

E. H. Johnson, one of Mr. Edison's assistants, stated at a meeting of the Merchant's Club, in Boston, that the time must soon come when a house or office will be lighted, heated and ventilated, and its elevator be run, altogether by electricity.

Touching the question of immigration, some of the recent suggestions of the State Board of Charities meet with general approval. The Act of 1882 should be so amended as to afford "protection to the United States against the shipment of convicts, lunatics, and other helpless persons by way of the Canadian and other exposed inland borders." The board also urges that steamship companies should be forbidden by law to bring to this country persons belonging to any of the proscribed classes, and should be punished for violation of such prohibition. It is also suggested that the execution of immigration laws should be intrusted, not to State or local boards, but to Collectors of Customs and to Commissioners appointed by the Secretary of the Treasury.

The new Italian tariff came into effect January 1. During the first ten months of last year goods to the value of about 83,000,000 lire have been imported into Italy in excess of the quantity of the corresponding period of the previous year.

The New York pilots number 136 men and have in the service 21 staunch boats. During the year they piloted 6651 vessels, and their earnings amounted to \$430,275.

An interesting commercial event this week is the opening of the new Fruit Exchange on State and Bridge streets. The building is of brick with brown-stone trimmings and terra-cotta cornices. The interior arrangements are unique. The first floor is taken up as a grape salesroom, and the seats are of the regular theater style, so arranged that when the room is not being used as a salesroom the whole seating part of it, by a simple mechanical attachment, may be raised to the ceiling. Elevators run by hydraulic power bring the grapes from the cellar right in front of the prospective buyers. The second floor is devoted to office use. Along the side are the desks for the clerks, and at the left is a room for the importers fitted with 55 boxes, and in them each morning may be found the catalogues of the various sales. On the third floor is the green fruit salesroom. Like the grape room, it is fitted with seats of the same style, and will accommodate 325 people. Off this is the sample room for dried fruit, large and spacious. Each well-known fruit buyer has his own seat in each of the salesrooms. Electric bells and all modern conveniences have been put in the building unsparingly. At the top of the building is a tank holding a supply of 6000 gallons of water, which in case of fire can be used to flood the building.

Rathbone, Sard & Co., of Albany, one of the biggest stove manufacturing firms in the country, made a proposition to their men to go into partial co-operation for the next year. If the men accept the proposition it will go into effect at once. One of

the members of the firm said: "It is well known that in 1885 our employees suffered greatly from the effects of a prolonged strike. In 1886 also strikes and lockouts effected considerable pecuniary loss to the men, and in 1887 we paid in wages \$70,000 less than in the preceding years, notwithstanding the fact that the men were working at an advance of about 10 per cent. over wages in previous years. Desiring to have matters run along smoothly between our employees and ourselves, a meeting of the molders was called for a conference with us, that we might exchange views on plans for the coming year. Our proposal is that there shall be no reduction or advance in the wages paid last fall, which were acceptable to all the employees; there shall be no lockouts or strikes; no discrimination shall be made against any man because he is a member of any organization, and all minor grievances shall be referred to a shop committee. Ten per cent. of the wages of the men shall be retained until the end of the year to insure the fulfillment of this agreement. If the employees enter into a strike within that time the amount retained shall be forfeited by them, and if the firm make a lockout they are to pay to each molder an amount equal to that portion of his wages held back."

The Cooke Natural Gas Company have been organized at Chicago with a capital of \$1,000,000 to explore for natural gas and to supply the same to the people of that city.

Why it is impracticable to telephone across the Atlantic was stated by Professor Jacques in a public address last week. There was no technical difficulty, the speaker observed, in the way of long distance telephony, but only that of cost. The longer the distance the thicker the wire must be. To converse between Boston and Worcester a wire the size of a needle would suffice. For conversation between London and New York it would be necessary to have a wire as thick as a man's arm, and as such a line would have to be a cable the insulation and covering would make the wire as great in diameter as a hog'shead. So that, while speaking by telephone between London and New York was scientifically possible, it was certain that such a line would never be laid, owing to the great cost the construction of it would involve.

The Commissioner of Public Works, General Newton, in his annual report, states that the total expenditures of the department for the year were \$5,099,821. There were 24,873 feet of 12-inch pipe and 56,571 feet of 6-inch pipe laid in the city during the year. The city now has 619.88 miles of water pipes, with 6402 stop-cocks, 7984 fire-hydrants and 16,552 water meters in use. Excavations were made in the streets for 99 miles of gas mains, 254 miles of electrical subways, 4790 feet of steam pipes, 3790 of salt water pipes, 10,500 feet of rail tracks and 17,973 house connections. The city has now 421 miles of sewers. The city lights 478 miles of streets and 62 acres of public parks with 24,719 gas lamps, 831 electric lights and 120 naphtha lamps, and has 1118 miles of gas mains. The water rates collected amounted to \$2,529,974.42, and \$128,098.73 was collected for sewer permits and other miscellaneous items. The income of the department was \$171,853.31 more than in 1886.

The gross receipts of the Brooklyn elevated railroad last year were \$176,000, and the net earnings were \$68,000.

A Chicago letter says: "Herbert C. Ayer, who a few years ago was a rich man living in great state, and who was ruined by the failure of his iron mills in Ohio, has returned to Chicago. It is said that he comes back to realize, if possible, upon his equity in the big estate of his firm. The

iron mills have been doing splendidly under the receivership, and have, it is said, been making money ever since the failure. If he succeeds in recovering the equity he claims, he will again be a rich man."

The 65 lumber mills on the Saginaw River, in Michigan, last year manufactured 766,375,696 feet of pine lumber, and 13,285,569 feet of hardwood lumber, a total product of 779,661,265 feet. At the close of the season about 180,000,000 feet of lumber remained on the river, much of it already sold.

Frederick Mercur, general superintendent of all the coal interests of the Lehigh Valley Coal Company in the Wyoming, Mahanoy and Snowshoe regions, died at Wilkesbarre of typhoid fever. He was 51 years of age. Twenty years ago he was chief of the engineering and construction department of the Lehigh Valley Railroad Company.

There were erected in Boston last year 390 structures of stone or brick and 1555 of wood, and the season is pronounced the best for several years. Labor troubles were averted by adopting payment by the hour. Wages were advanced 10 to 15 per cent. over the previous year. Prospects for the year 1888 are good. Among new projects is a building for the Produce Exchange.

The new State House, nearing completion at Austin, Texas, is second in size only to the National Capitol at Washington, and represents a money value of \$7,000,000.

The work on the Harlem Canal is steadily progressing despite the winter weather.

Alleged discrimination in tolls by the Canadian Government against vessels from United States ports passing through the Welland Canal will be made the subject of inquiry at Washington.

The schedule adopted by the conference of wool growers, wool dealers and wool manufacturers is similar in many respects to the tariff of 1867. All of the classes remain identical with the existing wool tariff. The rates of duty, however, are increased in several instances as high as 10 per cent.

Apple exports from this country last year comprised 432,000 barrels, most of them going to Liverpool, London and Glasgow. About one-half of the aggregate were shipped from New York. Canadian apples were preferred.

The available wool supply of California for the year 1887, including the receipts from Oregon equal to 7,250,000 pounds, amounted to 43,360,000 pounds, and the total exports amounted to 27,462,000 pounds, valued at \$5,000,000. The value of wheat exports for the year was \$7,692,000, comprising 102 cargoes as compared with a valuation of \$11,000,000 for the previous year and 188 cargoes.

New York city, through the Land Commissioners, have acquired right and title from the State to the water front in the annexed district, and the Dock Commissioners now have no impediment in commencing improvements of great value to the shipping interests. By the terms of the grant nearly all that portion of the water front of the annexed district outside of the original high-water mark to a line beyond which it would be impracticable to build piers or docks from West Farms, on the Bronx River, down the Bronx to Long Island Sound, through Bronx Kills, the Harlem River and Spuyten Duyvil Creek to the Hudson, and north on that river to the Yonkers line, passes under the control of the city.

The New York Department of Public Works is allowed \$3,180,000 for the year 1888, an increase over last year's appro-

priation of \$420,000. The total appropriations for all the departments is \$33,800,000, against \$31,843,022 last year, and \$31,552,320 in 1886—a progressive increase which is an admonition to tax payers.

There is reason to believe that the Lehigh Valley Railroad Company contemplate providing extensive terminal facilities in Jersey City, and that the work will commence next spring.

River men on the Ohio strongly object to the construction of another bridge at that point for which application has been made to the War Department. Three have been erected already, and a fourth, for the Chesapeake and Ohio Railroad, is in course of construction.

Consular reports received in England from all parts of South America as well as the Central American States indicate ceaseless activity in pushing German trade. In one of the Brazilian provinces German imports of woolen goods already exceed those of English manufacture fivefold, and British cottons are being gradually crowded out. In Costa Rica German competition is no less vigorous, even in such lines as hardware and cutlery, of which English traders were supposed, until lately, to have almost complete control. Competition with British goods is felt especially in the Chilean market, as at Valparaiso, where the Germans are said to be more successful in conforming to the changes of style, pattern, &c., which are constantly demanded. Many other points are named where similar encroachments are making on former methods. In seeking an explanation it is remarked that the Germans are more thoroughly trained in mercantile affairs, and are solicitous to ingratiate themselves with the people whose patronage they desire.

A solid argument in favor of a more rigorous enforcement of the immigration laws appears in the report of the New York State Board of Charities, showing that since the year 1880 the number of insane persons in the asylums has grown from 9537 to 14,062. In seven years the increase has been nearly 48 per cent., which is a ratio far beyond the increase of population. This great disparity is due to the admission of undesirable persons from abroad.

The tax assessment books for 1888 are now open for correction in the office of the Department of Taxes and Assessments. The total real-estate valuation of this city is \$1,306,310,133. Every ward shows an increase over last year. The increase in the Twelfth Ward is \$18,671,320; Twenty-second Ward, \$8,745,463; Nineteenth Ward, \$5,971,020. The books will remain open until April 30, but the tax rate will not be fixed until August or September. Mayor Hewitt in his recent message refers to the injustice to which this city is subjected by the State Board of Assessors in arbitrarily raising the amount of taxes apportioned to the city and county of New York, and expresses the opinion that the city would largely gain by the abolition of taxes upon personal property. He says the amount collected at this time is about one-sixth of the whole amount of taxation. If personal property, except bank shares, were relieved of taxation it would not be necessary to add more than one-sixth to the rate upon real estate, which last year would have amounted to 0.36 of 1 per cent., thus raising the total taxation to 2.52 instead of 2.16, which was annually paid.

The New York State finances, as shown by the annual report of the Comptroller, are in a good condition. In the report of last year it was estimated that the actual surplus upon September 30, 1887, would be \$2,572,666.39. By this report the actual surplus is shown to be \$3,714,907.55, ex-

ceeding the estimate by \$1,142,241.16. The chief causes of this excess are the prison receipts, the tax upon collateral inheritances and the tax upon the organization of corporations. For the current year the State tax is \$9,075,046.08, the rate being 2 $\frac{1}{2}$ mills, and the valuation \$3,361,128,177. The gross State debt September 30 was \$7,444,310, most of which is known as the canal debt, and which was reduced nearly \$1,500,000 during the past year. Deducting the sinking fund, the net debt is \$4,158,436.

The American colonists in Sinaloa, Mexico, are reported to have become well established and fully satisfied with their prospects. The country is remarkably productive.

The agreement between the city and the New York and Harlem Railroad Company for the sinking of the tracks in the annexed district, and the building of 9 miles of retaining wall and 38 bridges, has been officially signed. The work, which will be entirely at the expense of the railroad company, will begin February 1, and will cost about \$2,000,000. The track will be depressed about 10 feet from 138th street to Woodlawn, and 38 bridges will cross it, with suitable approaches.

The old scheme of building a canal around Niagara Falls has been revived in a bill introduced by Representative Nutting, of the Oswego district, "to create a navigable waterway between Lake Erie and Lake Ontario." The proposed canal will leave the Niagara River between Buffalo and the falls, and make a circuit 6 miles in length. It will, according to surveys already made, cost about \$10,000,000 or \$12,000,000.

A bill introduced into the Legislature of Ohio requires that corporations doing business in that State and having disputes or differences with their employees shall first submit a proposition for arbitration, before appealing to the authorities for protection; failing to do this, the cost of any protection which, in any case, may become necessary must be collected from the corporations.

At the annual meeting of the Merchants' Exchange in Buffalo last week President Smith directed attention to the fact that, owing to the commanding position of the port with reference to the great water ways, Buffalo is rapidly becoming the focus of one of the most extensive railway systems in the whole country. During the past year railroad and canal traffic acquired an immense volume and the lake marine interests enjoyed a season of unusual prosperity.

Montreal had a good building season in 1887. About 3000 houses were erected. The greatest activity was in Hochelaga, caused by the erection of numerous factories. Houses ranging in value from \$3500 to \$10,000 were most in demand. The coming season is expected to be unusually good, on account of the opening of the Sault Ste. Marie route to the Northwest and the prospect that the traffic of the Northwestern States will go through Montreal. On this latter point Canadians are sanguine. The Montreal Herald says the Canadian Pacific Railway people expect to carry about all the flour going from Minneapolis to New England points, and to do the greater part of the carrying trade between New England and the Canadas and the great Minnesota cities.

A pontoon bridge, consisting of 17 sections, each 30 feet in length, has been built at Camden, Me., for L. B. Smith, the American consul at Curacao, South America, who has obtained from the Governor concessions for 30 years. The bridge cost \$40,000 to \$50,000.

The Iron Age

New York, Thursday, January 19, 1888.

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On the 13th inst. a meeting of the Western Coke Association was held at Pittsburgh, the results of which are looked forward to with much expectation. The association represents the iron-makers of Pittsburgh and all points west of that city, whose daily consumption of coke is estimated to be 500 cars, which will convey some idea of the magnitude of the interests. The Western coke-iron makers have been sorely pressed during the past year. The rise in pig iron during the latter part of 1886 and the earlier months of 1887 was made a pretext by others to prey on them. The advance in Lake Superior ore, chiefly due to exorbitant lake freights, was in itself a burden not easily carried, though circumstances may have justified it. But it was a different matter with coke prices and with freights. The former were jumped to \$2 per ton on cars at ovens in the Connellsville district, and though the coke syndicate has lately reduced the figure to \$1.75 even that price must be regarded as excessive, considering the decline in the price of pig iron. The coke consumers have justly entered a protest against such extortion, and urgently request that the price be fixed at a rate not higher than \$1.50 per ton, f.o.b. ovens. It is well known that the coke producers are making a very handsome profit at that price, but it seems difficult, if not impossible, to make them realize that the shortsighted policy they are now following is throttling an industry upon which their future must depend. But they have not been alone in their eagerness to grasp for the lion's share of what margin the Western iron-makers may have had in sight nor in their anxiety to perpetuate unjust exactions. About a year since railroad freights were advanced from \$1.50 to \$1.65 per ton from the Connellsville region to the various points in the Mahoning Valley. As the haul is only 120 miles it will be seen the rate is close to 1.4 cents per ton per mile on a commodity so cheaply handled that the cost is certainly considerably below 1 cent per mile. In other words, Western pig-iron makers are paying for 1 ton of coke alone \$3.40 per ton at furnace, while the freight on pig iron to points in Ohio and Illinois fluctuates between \$2.50 and \$4. Add to this the fact that a very similar state of affairs exists so far as the ore is concerned, and the desperate straits into which the manufacturers are being driven will be appreciated, especially those of them who produce foundry and mill irons for the open market. The coke consumers ask that freights be reduced 20 per cent. at least, so that they would be somewhere between \$1.25 and \$1.33. Such a demand seems reasonable considering on the one hand the decline in pig iron and on the other hand the fact that it leaves the railroads an

ample margin. It remains to be seen whether a short-sighted cupidity or a broader enlightened policy will carry the day.

The plea is put forward by the managers of the recently consolidated natural gas companies of Pittsburgh that competition in the past has led to unremunerative prices. The handsome dividends distributed monthly to stockholders are somewhat at variance with this excuse for a general increase in rates for gas. One point is made, however, which will be accepted as more reasonable. Numerous instances are cited of wide inequalities in the prices paid by manufacturers and private consumers, and it is insisted further that reform is urgently needed in the wasteful habits of those who use the gas. Manufacturers outside of the gas regions will gather courage from the latest developments and should turn with all the more energy toward the utilization of low grade coals to make artificial gas.

The magnitude of the operations of the large steel works must be taken into account as an important factor in the pig-iron trade. Out of the total estimated product of 2,110,813 gross tons of coke and anthracite pig iron for the second half of 1887 we find that not less than 909,363 gross tons were produced at the furnaces of the large rail mills—viz., the Troy, Bethlehem, Cambria, Lackawanna, Pennsylvania, Cleveland, Joliet, South Chicago, Union, Western, Edgar Thomson and Colorado. We have included in the figure given the product of spiegeleisen, and the output of furnaces like the Ashland, Blair, Franklin, of New Jersey, and Jupiter plants leased or controlled by steel-rail mills. To this must be added 110,441 gross tons produced by such plants connected with rolling mills like the Pioneer, Belmont, Riverside, Tap Mill, Bellaire, Benwood, Jefferson, Mingo and Steubenville. Then come the outside plants making exclusively Bessemer pig, like the Secaucus, Chester, Lucinda, Norristown, Robeson, North Branch, Bird Coleman, Donaghmore, North Cornwall and Lebanon among the anthracite, and the Douglas, Ella, Fannie, Florence, Stewart, Soho, Grace and Himrod among the coke furnaces. Their aggregate product in the second half of 1887 was 247,272 gross tons. In addition to this a heavy though unfortunately an unknown proportion of the product of the following plants was Bessemer pig: Crane, Reading, Pequest, Durham, Paxton, Claire, Mabel, Sharpsville, Carrie, Lucy, Schoenberger, Dunbar, Rockwood, Zanesville, Missouri and Bay View, whose output is estimated at 291,898 gross tons. We believe that we are not far from the truth when we estimate that at least 150,000 tons of this make was Bessemer, which would swell the total to 1,170,000 tons, not counting charcoal pig. Roughly, this leaves less than 1,000,000 tons of foundry and mill iron, and of this, Virginia, Georgia, Tennessee and Alabama must be credited with 260,000 to 265,000 gross tons, or a little over one-quarter. When it is taken into consideration that of the 1,000,000 tons alluded to a very large proportion is used directly in mills owning the furnaces, then it will be more readily understood why the Southern iron plays such a rôle in the markets. Looking at the grand totals of pig iron

production, it may appear a small factor, but when we aggregate the iron used for steel purposes, and consider that the quantity used in Southern rolling mills is relatively small as compared with the amounts consumed in Northern and Western plants owning furnaces, then the fact will be appreciated that the quantities of pig sent East and North by Southern makers represent a very important percentage. The open market for mill and foundry iron is limited, and in that light the present product of the older plant and the prospective increase mean far more than the swelling of the make of the country by 350,000 or 400,000 tons annually on the top of nearly 6,000,000 of anthracite and coke pig.

Mr. Percy Gilchrist has just issued his instructive tables showing the growth of basic steel manufacture in Europe. For the year ending October 31, 1887, the figures are as follows:

Countries.	Total tons.	With under 0.17 p. cent. carbon.
England.....	364,526	233,358
Germany, Luxemburg and Austria..	1,102,496	826,609
France.....	174,271	123,049
Belgium and other countries.....	60,959	39,716
Total, 1887.....	1,702,252	1,222,732

For the corresponding period in 1885-1886 the returns show the following:

Countries.	Total tons.	With under 0.17 p. cent. carbon.
England.....	258,466	161,908
Germany, Luxemburg and Austria..	883,859	651,523
France.....	122,711	77,141
Belgium and other countries.....	48,595	36,712
Total, 1886.....	1,313,631	927,284

The percentage of mild steel in the total has remained nearly the same, rising from about 71 to 72 per cent. of the total. Nearly all the different countries participate equally in the increase in the total, which has now reached 1,702,252 tons. It would be instructive to know how large a percentage of the total steel product of the countries named is now made on a basic lining. This, however, is manifestly impossible so long as Mr. Gilchrist continues to use an odd period as the basis of his reports. We trust that in the future he will adopt the calendar year.

To the metal and allied trades probably the most interesting news of the week has been the statement emanating from a good source that it is possible that the Calumet and Hecla mine may be reopened by the 1st of February. This would mean an addition of a little over 2,250,000 pounds of ingot copper per month until the 1st of March. Then the completion of three of the new stamps of the company would carry the monthly output to a little over 5,000,000 pounds. Should the two events referred to come to pass, then the output of the mine for 1888 would be 56,000,000 pounds, against 45,500,000 pounds during the year 1887. Add fully 30,000,000 pounds for the other lake mines, and a total estimate for 1888 is reached close to 86,000,000 pounds, against about 74,500,000 pounds in 1887 and nearly 79,000,000 pounds in 1886. The chief significance of

a recovery of the great mine from its present troubles would, however, be that its managers would probably become aggressive opponents of the bull speculators, at least in this country. It is not to be expected that prices will quickly fall back to the normal figure—that is, to the price which will allow of an ample production in this country and in the world generally, leaving a good margin to mine owners. Under ordinary conditions of supply and demand 12 cents is quite generally regarded as a fair price, but those who have studied the situation do not expect any material decline for some time to come.

Restriction of Copper Production.

There has been considerable talk lately of schemes under way to restrict the copper production in Spain and the United States by agreement. Negotiations of this character have been repeatedly opened during the past few years, but have always met with a decided refusal on the part of the leading lake producers, while the principal Montana mines are said to have been favorably inclined. An examination of the points at issue may be of some value. In 1886 the copper product of the world was estimated at 214,533 gross tons, of which Spain was credited with 49,653 gross tons, or about one-fourth; the United States with 69,971 gross tons, or a little less than one-third; and Chili with 35,025 gross tons, or about one-sixth, leaving 59,885 gross tons for the rest of the world, Germany leading with 14,465 gross tons. To some extent these figures would be modified if we had the official returns for the 1887 output, but they suffice to indicate that, important as are Spain and Montana as producers, both of them together would not control half of the yield, even if the smaller lake mines were thrown in, and a minor Arizona producer, spoken of in this connection, were added. The experience of those who have been engaged in any combinations to hold values by restricting output, with only a few small outsiders, will amply suffice to prove that success can never follow a scheme which leaves over half the capacity out of the reckoning. Such an attempt is the more manifestly absurd when it is considered that present prices are abnormally remunerative even to the weakest.

But there are added difficulties to the carrying out of any plan to restrict the output of copper inherent in the methods naturally employed at the Spanish mines. The copper ore of the Peninsula is an iron pyrites, carrying about 3 per cent. of the metal. A very considerable part of the ore raised from the mines is shipped as it is to Great Britain and the Continent to be burned by the manufactures of sulphuric acid by the old Leblanc method. The roasted ore is then leached for the copper and the precious metals it contains. Thus the Rio Tinto in 1886 shipped 336,548 tons of pyrites, against 406,772 tons in 1885, while the Tharsis Company shipped 273,298 and 311,151 tons respectively, the Mason and Barry and other smaller mines adding their quota. In England alone the amount of metal extracted from these burnt pyrites must be close to 15,000 gross tons. It is true that in the majority of cases the Spanish mines keep control of the copper themselves, but it is evident that any plans of restriction would not touch this

part of their product. The ore which is worked on the spot at the Spanish mines is treated by two methods. The older system, that still in use with all the companies with the exception of the Rio Tinto, is to burn the ore in large heaps and then to dissolve the copper by means of water, preprecipitating the copper from the solutions by means of iron scrap or pig iron. This process is comparatively slow, so that it takes vast quantities of water and much time before the ore is exhausted. For years the waste heaps continue to yield metal, and as there can be no question of storage of solution it must be precipitated. The result is that any agreement made to reduce output would only become operative after a considerable lapse of time in the case of all the mines employing the old burning methods. Millions of tons are lying at the mines which steadily yield some copper which stands on the books of the companies at a very low valuation and is supposed to be the principal asset upon which the issue of large bonds is based.

The second method, known as the Doetsch process, is based upon the extraction of copper from the raw ore, so that its value as a sulphur ore is not impaired, the sulphur being wasted in the old method. This method is employed by the Rio Tinto exclusively, which is treating by it about two-thirds of the 1,000,000 tons annually leached "on the spot." Here, too, a gradual restriction only is possible, and can only be accomplished by limiting or entirely ceasing to lay down fresh heaps of ore. But after once adopting the policy of limiting the output, the Spanish mines could only, after a long period, carry their make back to normal product, and it would take them years to reach the point which they have been ambitiously straining every nerve in the past. They cannot, at a day's or a month's notice, close down mine and extraction works, as other producers, for instance, in this country could stop working. Once embarked in such an undertaking the Spanish mines would be at the mercy of their allies should the latter see fit to break the compact and rush back to work at full capacity. The only natural cause which has at times restricted production in the Peninsula have been droughts, and even against these some of the companies have made elaborate preparations by building costly storage reservoirs and providing an elaborate water service. To their rivals no better means could be devised for crippling the Spanish mines for a long time to come than to lead them into some scheme for restricting output. The trade may, therefore, dismiss as idle gossip any assertions that any such plans will be seriously considered to bolster up the price of copper. There is more chance for arrangements looking to stopping any further increase, which is now spoken of.

It may be well in this connection to recall a few facts which show on how flimsy a foundation the present gamble in copper rests. In 1886, with Chili bars averaging close to £40, Rio Tinto, Tharsis and Mason & Barry paid small dividends, their aggregate output being about 43,000 gross tons. In Germany Mansfeld, with a product of about 12,000 tons, showed its cost to be about £36. The Cape Copper and Namaqua companies of South Africa, with an aggregate make of 6000 tons, showed

dividends for the former which the latter went on increasing. The Chilians, with a product of 35,000 tons, were sorely pressed, but £50 would probably leave a balance for nearly every going concern. Of the 10,000 gross tons produced in Australia the same statement may be made, and it can be stated positively that £45 for Chili bars means a profit to the producers of at least 60,000 tons out of the 70,000 tons made in this country. We feel convinced that at £50 as the average price of the year very large profits would be made by producers representing not less than 200,000 tons of copper. So large, indeed, that a heavy increase in the product must naturally follow. The world's requirements can be more than met under these conditions. Is it reasonable to suppose that men versed in the copper trade of the world, deeply interested in large concerns, would long attempt to hold the metal above its natural plane unless they mean to part with their holdings of stock to a deluded public? They may be guided by the principle *après nous le déluge*, but it would certainly seem wise for the trade from the manufacturer to the smallest dealer to resist their schemes to the utmost.

Public opinion in France has been very emphatic of late in condemnation of the methods of the "syndicate," and the vigorous protests of the press in Paris may have a more serious effect upon their operations than we are quite able to understand on this side of the Atlantic. Here "corners" have become somewhat odious, chiefly because they have ended in miserable failure in a few conspicuous instances. There appeals to the Government are apt to lead to unfriendly measures which would be impossible here.

Western steel rail manufacturers have a just cause of complaint against the railroad companies for the manner in which they are being discriminated against in freight rates. They receive their coke from the Connellsville coke region over railroads hauling Eastern-made steel rails to the West. The rate on a gross ton of coke from the ovens to Chicago is about \$3.70, while the rate on a ton of steel rails from Pittsburgh and vicinity to Chicago is \$3. As the distance over which the coke is hauled is but a little further than the distance from Pittsburgh to Chicago, this is evidently too high a rate on the crude material as compared with the finished product. But to establish a parity, the quantity of coke entering into the manufacture of a ton of steel rails should be considered. The average quantity of coke required in the conversion of iron ore into steel rails is $1\frac{1}{2}$ tons per ton of rails. This increases the disparity between the two freight rates, making the rate on raw material seem entirely too high. But, again, while the freight rate on steel rails from Pittsburgh to Chicago is said to be \$3 per gross ton, it can be shaded very considerably. Taking all the circumstances into consideration, the discrimination against Western steel-rail manufacturers in favor of their Eastern competitors is \$1.50 per ton and upward, according to the advantages enjoyed by the latter in getting low freight rates on steel rails sent Westward. This is a matter which calls for a rearrangement by the railroad companies in a spirit of fairness to all interests. As long as the Western rail manu-

facturers are obliged to depend upon the Connellsville region for their supply of coke they are, of course, compelled to receive it over the railroad lines of whose treatment they complain, and the business is therefore a certainty upon which these railroads can depend. But it is certainly unjust to subject the Western manufacturers, who are such important patrons, to competition upon unequal terms with other manufacturers whose products are hauled over the same tracks to reach the Western trade.

New Iron and Steel Works.

As it is a matter of more than passing interest to the members of the iron trade, we have carefully examined a copy of the new list of iron and steel works issued by the American Iron and Steel Association, for the purpose of compiling a list of the works now in course of construction in the country. The ground covered is, of course, more or less familiar to our readers, as all the enterprises referred to have been noticed from week to week in our department of industrial news, if not at greater length in special articles. Not a single blast furnace is reported to be in course of construction or even projected in New England, New York or New Jersey. In Pennsylvania but one stack is being built, that of the Cameron Iron and Coal Company, at Emporium, Cameron County, which is to be a coke furnace, 75 x 18. In Maryland two stacks, each 85 x 22, are being built at Sparrow's Point, near Baltimore, by the Pennsylvania Steel Company, which will use mixed fuel of anthracite and coke. These are the largest furnaces now under construction, and will be larger than any other furnaces in the country. In Virginia one stack is being erected near Lynchburg by the Virginia Iron and Nail Works Company. It will be a small furnace, 65 x 12½, and will be operated on coke. The New River Mineral Company are, however, changing their Ivanhoe Furnace, in Wythe County, from charcoal to coke, and will make the stack 60 x 13½.

In Alabama twenty furnaces are reported in course of erection, of which two will use charcoal and the others coke. One stack, 65 x 17½, by the Birmingham Furnace and Manufacturing Company, at Trussville; four, each 80 x 20, by the Tennessee Coal, Iron and Railroad Company, at Pratt Mines; one stack, 75 x 15, by the Gadsden Alabama Iron Company, at Gadsden; one stack, 75 x 17, by the Lady Ensley Furnace Company, at Sheffield; one stack, 75 x 17, by the Pioneer Mining and Manufacturing Company, at Birmingham; three stacks, each 75 x 18, by the Sheffield and Birmingham Coal, Iron and Railway Company, at Sheffield; one stack, 75 x 17, by the Sheffield Furnace Company, at Sheffield; two stacks, each 75 x 17, by the Sloss Iron and Steel Company, at Birmingham; one stack, 75 x 18, by the W. B. Wood Furnace Company, at Florence; one by the North Alabama Furnace, Foundry and Land Company at the same point; two stacks, each 75 x 16, by the Woodstock Iron Company, at Anniston; one charcoal stack, 60 x 12, by the Decatur Land, Improvement and Furnace Company, at Decatur; one charcoal stack, 60 x 12, by the Montgomery Furnace and Chemical Company, at Montgomery. Eight of these furnaces are

being built at Birmingham or in its immediate vicinity, five at Sheffield, two at Florence and two at Anniston, thus showing the tendency to concentration in this State. In Tennessee one coke and two charcoal furnaces are reported, but since the list was printed contracts have been made for the erection of another coke furnace. These enterprises are as follows: One coke stack, 75 x 17, by the Tennessee Coal, Iron and Railroad Company, South Pittsburgh; two charcoal stacks, each 60 x 12, by the Nashville Iron, Steel and Charcoal Company, West Nashville; one coke stack, dimensions not ascertained, by the Dowling Blast Furnace Company, Chattanooga, which is the new enterprise referred to above.

Of all the other Southern States, Texas is the only one in which a new furnace is being built. This is a charcoal stack, 55 x 9½, by the Marshall Car and Foundry Company, of Marshall. A company has been organized at Memphis, Tenn., to build a furnace at a newly discovered ore deposit in Mississippi.

In Ohio only two new furnaces are reported under construction, one charcoal stack, 52 x 10½, by the Hecla Iron and Mining Company, of Ironton, and one raw bituminous coal stack, 65 x 15, by the New York and Perry Coal and Iron Company, of Shawnee, Perry County, which, however, is now making iron.

In Michigan the Antrim Iron Company, of Mancelona, have just finished one charcoal stack, 48 x 10. In Wisconsin the Ashland Iron and Steel Company, of Ashland, have about completed one charcoal stack, 65 x 12½, and the Northwestern Iron Company, of Mayville, are remodeling their old charcoal furnace to use coke, and practically making it a new one, 67 x 13. In no other Western State, not even in Illinois or Missouri, is a new furnace being built, although one is talked of at Rockford, Ill., to run on ore from Iowa, for the purpose of developing a deposit in which Rockford capitalists are interested.

On the Pacific Slope a new charcoal furnace, 60 x 13, is being erected by the Oregon Iron and Steel Company, of Oswego, Ore., but this will simply take the place of the company's old furnace.

The enterprises above enumerated do not embrace a number of furnaces in various sections of the country which have figured prominently for some time among the works in course of construction, because they have been completed, and are now either in operation or soon will be, while some furnaces are included which have been completed within the past month.

The rolling mills now being built do not present such an imposing array as the blast furnaces. Two are in course of erection in Pennsylvania, two in Alabama, four in Ohio and one in Missouri. Some of these include puddling furnaces in their plant, indicating the belief of their projectors in the ability of puddled iron to hold at least a part of the iron trade against the encroachments of steel. In Pennsylvania the Sheldon Axle Company are building a mill at Wilkesbarre to roll bar iron and steel for axles, and the Johnson Steel Street Rail Company are putting up works at Johnstown to roll street and other rails from purchased blooms. In Alabama a mill to roll bar and band iron, cotton ties and light T and street rails is being erected

at Birmingham by the Alabama Rolling Mill Company, and another is under way at Bessemer by the Bessemer Rolling Mills to make bar and sheet iron and rails. At Toledo, Ohio, the Maumee Rolling Mill, which was burned last April, is being rebuilt to roll sheet, angle, plate and bar iron. At Bowling Green, Ohio, the Bowling Green Iron and Steel Company are building a merchant mill. At Findlay, Ohio, the Findlay La Grange Rolling Mills are re-erecting the machinery of the old mill at La Grange, Mo., and will make merchant iron. These three mills will use natural gas for fuel. Two new mills making bar iron were put in operation in 1887 at Findlay, one by the Findlay Iron and Steel Company and the other by the Findlay Rolling Mill Company. Another rolling mill in course of erection in Ohio is that of the Jackson Steel and Nail Mill Company, at Jackson, which will contain 60 nail machines. The new rolling mill in Missouri is being built by the Kansas City Bolt and Nut Works, a branch of the Reading Bolt and Nut Works, of Reading, Pa.

The Bessemer steel works reported in course of erection are those of the Duquesne Steel Company, of Pittsburgh; the North Branch Steel Company, of Danville, Pa., and the Centralia Iron and Nail Works, of Centralia, Ill.; but these have been practically completed by this time. The first two have two-vessel plants, while the last named has one 2-ton converter. The Howard Rolling Mill Company, Limited, of Howard, Center County, Pa., are now putting up a converter to make steel for their wire-rod mill, which was determined upon after the list was printed. Bessemer steel works are contemplated at East Chicago, near Hammond, Ind., but definite arrangements have not yet been made for their erection. The scheme of the Moss Bay Hematite Iron and Steel Company, of Workington, England, to erect iron and steel works near Tacoma, Washington Territory, is also being held in abeyance. The open-hearth steel works which are being built are few in number. The Bethlehem Iron Company, of Bethlehem, Pa., who have had a plant of this character standing for several years in an unfinished condition, are building another plant, to consist of four furnaces. The Phoenix Iron Company, of Phoenixville, Pa., are building two furnaces. The Henderson Steel and Manufacturing Company, of Birmingham, Ala., are building one furnace on the Henderson system.

In other steel-making processes the new work being done is very limited. Graff, Bennett & Co., of Pittsburg, are re-erecting at their works the Clapp-Griffiths converter originally built at Port Henry, N. Y., and Schulte, Nehring & Co., of Evansville, Ind., are putting up a crucible steel plant of small capacity, to make soft steel castings.

In looking over this list of new enterprises we are impressed with the fact that by far the greater number of them are in an advanced stage of completion, so that the full force of competition from them, modified as it may be by the drawbacks incidental to the starting of new works, will be felt by the trade before the close of the current year or early in the next year, and that there will also be a cessation thereafter for an appreciable interval from the increase in productive capacity here in-

licated. We have not gone into figures of capacity or possible production, as they would necessarily be pure estimates and would have no special value. It will be well for the iron trade if it will not be possible for some years to present a list so formidable as this of new works in course of construction in the United States.

The Resources of Spain.

Trade between the United States and Spain and her colonies is so considerable that the international exhibition to be held at her leading peninsular port, Barcelona, to open on April 8th, next, is an event of no small interest to American producers and merchants. Spain, the Balearic and Canary islands, together with her North African military posts, cover an area of 504,551 sq. km. with a population in 1885 of 17,228,776, while her colonies extend over 429,120 sq. km. and are inhabited by 8,023,300 souls. The population of Madrid is 400,000, and that of Barcelona 300,000; the next largest Peninsular city is Malaga, with 120,000 inhabitants. The largest cities in each of the colonies are: Havana, 200,000, in Cuba; Ponce, 40,000, in Porto Rico, and Manila, 200,000, in the Philippine Islands. The public debt of Spain proper is very large, 6,324,070,926 pesetas, or francs, involving an annual outlay for interest of 237,161,098 pesetas. The budget for 1887-88 estimates the income at 850,596,753 pesetas, and the outlay at 855,753,015. The strength of the army is 100,000 men in the Peninsula, and 31,400 in the colonies, with 16,495 horses and 416 guns. The fleet is composed of 135 vessels, of which only eight use sails, with 64,698 horse-power and 492 guns. A dozen very fast new steel cruisers of the first class are now being built in England and Spain. The merchant navy comprises 1902 vessels of all classes, from 50 to 4256 tons as a range of capacity, and of these 426 are steamers of from 20 to 1600 horse-power. There were in operation in Spain last year 9185 miles of railway, 923 telegraph offices, with a length of line of 17,853 km. and 43,446 km. of wire, forwarding in 1884 3,281,885 messages, 1712 post offices forwarding inland 118,394,708 pieces of mail matter, and internationally 34,343,456. In Cuba 1490 km. of railway are in operation and 240 in course of construction, with 187 telegraph offices, and 4500 km. length of line, while in the Philippine Islands only 192 km. of railway are in operation, with 1149 km. of telegraph and 37 offices.

The import and export movement in Spain was as follows, in thousands of pesetas:

	1882.	1883.	1884.	1885.
Import.....	817,000	863,446	779,944	764,758
Export.....	765,000	719,468	619,192	698,003

The maritime movement was as under:

	Vessels entered in 1885.	Tonnage.
Spanish.....	7,421	708,211
Foreign.....	9,634	1,605,058
Totals.....	17,055	2,073,269

The Cuban budget for 1887-88 estimates the income at \$23,273,100, and the outlay at \$22,880,439; the Porto Rican at \$3,550,372 and \$3,551,841, respectively; while the Philippine is \$11,154,379 and \$11,260,979, respectively. The population of Cuba being 1,521,684, that of Porto Rico only 754,313 and that of the Philippine Islands

5,559,020, the expense involved in Cuban administration appears disproportionately large. The import into Cuba in 1885 was \$31,587,859, and the export \$56,636,404; the import into Porto Rico was \$11,745,022, the export, \$14,048,639; the export from the Philippine Islands was \$29,995,960. On reducing Peninsular exportation in 1885 to dollars it will be found that Spain and her colonies exported in a single year merchandise worth no less than \$240,281,603, gold, the joint population being 25,252,076, equal to \$9.10 per capita, while the United States during the calendar year 1885 exported \$673,593,506 worth of merchandise. The population being 60,000,000, the domestic export equalled \$11.21 per capita. Approaching in this item of percentage per capita so nearly our own country, as it does, the amount of products which Spain and her colonies are capable of shipping abroad in a twelvemonth, placed the nation high among commercial and maritime ones—hence its great mercantile importance and the readiness which other nations have shown to make preparations for a creditable show of theirs at the Barcelona exhibition. On October 8 last Don Emilio de Muruaga, minister plenipotentiary of the Queen Regent at Washington, invited our Government to appoint a Federal commissioner to superintend the interests of American exhibitors at Barcelona, and President Cleveland appointed Mr. Emile M. Blum, of the firm of E. M. Blum & Co., of this city, late in December, honorary delegate to represent the United States.

American trade with Spain and her colonies during the last fiscal year, 1886-87:

	Import into the United States.	Domestic Export.
Spain.....	\$5,570,808	\$12,753,634
Cuba.....	49,515,434	10,138,930
Porto Rico.....	4,661,600	1,707,241
Philippine Islands.	8,614,830	147,082
Spanish Possessions in Africa..	95,572	158,669
Total.....	\$68,458,304	\$24,906,156
Total trade.....		\$93,364,550

The United States and Spain have meanwhile agreed to prolong until June 30 next the suspension of differential dues upon vessels and cargoes from either country. Barcelona alone consumes 200,000 bales of American cotton annually, and the Peninsula takes a large amount of crude petroleum, staves, quercitron, lard and, to some extent, hardware. Barcelona is a beautiful seaport of Catalonia, the richest and, industrially and commercially, most active principality of Spain, divided into four provinces. The city was founded by the Carthaginians under Hamilcar Barca, 228 before Christ, and is the capital of Catalonia. Situated about 300 miles east-northeast of Madrid, Barcelona, the terminus of four railways, is one of the best built and cleanest cities of Europe. The city is equipped with both gas and the electric light, splendid fountains, good sewers, four public libraries, two museums, an Academy of Belles-Lettres, a Royal Academy of Arts and Sciences, a magnificent Cathedral and a handsome Palacio de la Deputacion or House of Assembly. Its cafés are among the most gorgeously decorated in Southern Europe. Its opera house, theaters, and especially its bull fights, draw thousands of visitors from other parts of Spain.

Spain is of great practical interest to the United States as the richest mineral coun-

try of Europe. There is hardly a metal in which the Iberian Peninsula does not abound; valuable iron ore, copper, lead, calamine, quicksilver, and even tin is found to some extent at Salamanca. The Spanish vintage yield of 1887 was 28,013,400 hectoliters, of which Catalonia alone turned out 5,241,000. Next there are the large crops of raisins, almonds, oranges and olives, and finally the corkwood and saffron. There has been a retrograde movement in but two articles, raw silk and merino wool. Much of Spain's prosperity is due to the Catalans themselves, a laborious, yet shrewd race of Gothic origin, having a language and literature of their own. That all commercial nations should be anxious to have a foothold in the Peninsular and Spanish Colonial trade is but natural, hence the interest attaching to this exhibition, which we trust may be well attended by Americans.

Power Expended in 'Cycling and Walking.

To the Editor of The Iron Age.—DEAR SIR: Referring to your recent quotation from the London Engineer relative to the power required for walking or bicycling,* I beg to say that the article conflicts with Newton's first law of motion, in that it claims force to be necessary to keep a body moving uniformly, resistance of air and friction being disregarded. Reference to the first calculation will show that it gives the work necessary for lifting one's own weight 308 feet in one minute, and gives the absurd result that in walking 3½ miles per hour a man does more work than a horse is capable of doing. In walking, the only work that can be calculated is given by the second calculation, 0.08 H.-P. This leaves out of consideration friction of joints and resistance of the air, the aggregate of which is probably about the same in 'cycling.

With a 50-inch wheel bicycle weighing 40 pounds, weight of rider 150 pounds, and a ¾-inch journal, assuming coefficient of friction at 0.05, the force necessary to overcome the friction will be, as stated, 9½ pounds. The work done in one revolution is $\frac{9\frac{1}{2}}{12} \times \frac{3}{4} \times 3.141592$

= 1.86 foot pounds. At a speed of 3½ miles per hour the wheel revolves 23.3 times per minute, making the horse-power required $0.00132 = \frac{1.86 \times 23.3}{33,000}$ According to Cou-

lomb we may take the coefficient of rolling friction for wheels of soft wood at 0.04. For the rubber tires of a bicycle it would be at least 0.05, radius of wheel 25 inches. The force required at the center of the wheel is $0.38 = 0.05 \times \frac{190}{25}$ the work is

$0.00026 \text{ H.-P.} = \frac{0.38 \times 23.3}{33000}$ Taking the

work done by the rider in lifting foot and lower limb at 25 foot pounds per revolution (15 pounds, twice lifted 10 inches), the horse-power required is $0.01766 = \frac{25 \times 23.3}{33000}$ The sum of

these three, 0.01924 H.-P., gives the total work, which compared with the work done in walking, 0.08 H.-P., would lead to the belief that the bicyclist would make about $4\frac{1}{6}$ times the speed of a walker on an asphalt or other smooth track.

JOHN BARTHOLOMEW.

Hudson Bridge Works.

HUDSON, N. Y., December 28, 1887.

*The Iron Age, November 24, 1887, page 20.

A New Cut Nail Machine.

To the Editor of *The Iron Age*.—DEAR SIR: The competition of late between the wire nail and the cut nail being so very warm I would like to call attention to a cut nail machine just completed, which turns out 800 of 8d. casing nails per minute, these nails running 164 to the pound, as against 170 of the wire nail. The holding power being 62 pounds in favor of the new cut nail, this machine running only 50 revolutions per minute turns out 330 pounds of nails per hour. It requires the services of one man to run six machines. The product is all ready to be kegged up as made. Now compare this result with that of a small wire nail factory started in this vicinity a year ago. They have

Eight machines costing in all.....	\$4,000
One engine and boiler costing.....	1,000
Machine shop tools costing.....	850
Fitting up, &c.....	385
	\$6,235

These machines give a total output of 60 kegs for 14 hours' run, selling at \$3 per 100 pounds or keg..... \$180

Now take the cost of production:

Wire for 60 kegs with 5 per cent. for waste, 6300 pounds at 2.38 cents.....	\$149.94
Labor to make the nails, 14 hours.....	11.86
Labor to clean and keg them.....	4.50
Engineer and fuel.....	4.25
Office expense in labor.....	2.85
Cost of empty kegs at 16 cents each for 60.....	9.60
Cost of selling at 10 cents each for 60....	6.00
Total.....	\$189.00

Thus showing a daily loss of \$9 per day, not taking into account rent, gas, water, insurance, &c.

Cost of 26,400 pounds steel for cut nails, 1.60 cents.....	\$422.40
Cost of kegs and selling.....	68.64
Cost of labor and office.....	10.00
Total.....	\$501.04

264 kegs nails at \$2.25 (10 hours' run)... 594.10

Giving a net gain of..... \$93.00

As these are actual figures from the two concerns they will doubtless be of interest to your many readers, and may be some one can explain how the wire nail can down the cut nail.

The cost of the new cut nail machine is \$600, so that eight would cost \$4800, compared with the wire nail machines.

W. ADLER,

MINNEAPOLIS, MINN.

Our correspondent appears to have made some oversight in his estimate of the cost of cut nails. He puts the cost of 26,400 pounds of steel for cut nails at 1.60 cents, and then gives the product at 264 kegs, so that there is apparently no allowance for waste in cutting, an important item—Ed.

Charles Himrod & Co., dealers in pig iron at Chicago and Detroit, have issued a chart showing the variations in pig-iron prices in the Chicago market by months, from January, 1882, to December, 1887. It is printed on stiff paper for hanging. The prices shown are for Lake Superior charcoal high numbers, Lake Superior charcoal low numbers, Lake Superior and Ohio blackband, Lake Superior coke and Alabama coke. At the foot of the chart is appended a summary by the firm of the four distinguishing features of the condition of the pig-iron business during the year 1887 as follows: 1. The production has been larger than ever before. 2. The consumption has been larger than ever, and larger than the production, so that stocks in the hands of both consumer and producer are lower now than they were a year ago. 1. For the first time during one of our periodical years of great activity the blast furnaces of the United States have been practically able to supply the demand. The importation of pig iron has been somewhat greater than last year, but not nearly so great as

has always been the case when we have had a year of as great activity as the past.

4. The capacity for production of pig iron under construction at the present time is greater than at any one time before. The increased capacity is largely coke furnaces being built in the Southern States. They add: "The year, on the whole, has been quite prosperous for all engaged in the iron business, and, we trust, will be followed by one equally as good."

Heating and Ventilating Stores.

To the Editor of *The Iron Age*.—The paper on Economical heating and ventilating of stores and buildings in general in the last *Iron Age** by Henry I. Snell, came the nearest to solving the problem for us of anything we have seen in print. We hope that we may hear more from him and others who have tried to solve this problem on a small scale that would be practical in country stores and halls.

Our case is as follows: A basement and two stories above are to be warmed, and we would like an engine to be used only part of the time. How to construct a boiler that is self-feeding and would warm the rooms when the engine is standing still is the problem for us. Perhaps some of your experienced correspondents can inform us how this can be done in a practical way.

S. LANDON & SON.

ANGOLA, N. Y., January 9.

Effect of the Reading Coal Strike on Iron Manufacturing in Eastern Pennsylvania.

So many considerations enter into the question how the iron-makers of Eastern Pennsylvania are affected by the Reading and Lehigh coal strikes that we have believed it best to submit below the replies received in response to an inquiry by leading producers in the districts affected:

THE MERION IRON COMPANY, PHILADELPHIA. FURNACE AT WEST CONSHOHOCKEN.

Pig Iron.

The coal strike has had the effect to force our works to go out of blast for want of coal. This is the case generally in the Schuylkill Valley. The consequence will be a large decrease in the make of pig iron, as many furnaces will not resume unless there is a decided improvement in prices of pig iron. If the market improves, as I believe it will, we may get in blast again within 30 or 40 days, provided coal, coke and ore can be had at old prices. There is or has been no profit in making pig iron (in fact, a loss in many cases for the past six months). It looks very much as if the price of pig iron must advance about \$2 per ton, owing to the stoppage of so many furnaces.

J. B. MOORHEAD, President.

J. WOOD & BROS. COMPANY, CONSHOHOCKEN, PENNSYLVANIA.

Sheet and Plate Iron, Box Annealed Sheet Iron and Soft Steel Sheets Specialties.

It does not affect us to any great extent. We use principally soft or bituminous coal, which is arriving regularly, and we are running as usual. We use some anthracite, and have been able so far to get all we want, although at an advanced price. Should we fail to get what anthracite we need we could fall back on coke, which we could use instead. The regular freight trains are running as usual, and we have no difficulty in shipping freight from our works. Several of the pig-iron furnaces in this vicinity are now banked up for want of coal. They seem to think they can keep

their furnaces hot until shipments are resumed. Should the strike continue for any length of time these furnaces would have to blow out or use coke, which would be too costly under present price of pig iron.

J. WOOD & BROS. COMPANY.

PLYMOUTH ROLLING MILL COMPANY, CONSHOHOCKEN, PA.

Pig Iron and Puddled Bars, Sheet and Plate Iron and Steel and Nails.

Replying to yours of 14th, the strike has proved very injurious to our business so far, with prospects of worse ahead. We have banked the Lucinda furnace, and have bought coal at a high price from the Wyoming region. With this and using half coke we have continued the Plymouth furnace in blast, but will bank or blow out in a week if matters do not improve. The Pennsylvania Railroad are in a position to greatly assist the Eastern furnaces by lowering the freight on coke, which is now about 20 per cent. above the rates at which the road carried it some years ago. A reduction in the cost of coke would be a permanent advantage to the coke men and the Pennsylvania Railroad, as it would give the anthracite furnaces a chance under favorable circumstances to see the advantages of using coke more largely. As the general average of freight is now at the lowest point on the Pennsylvania system, it is curious why they retain the freight on the coke at an exceptionally high point, instead of taking advantage of the situation to greatly help their iron customers and extend their trade in coke. This week, if the coal strike continues, will force many more furnaces either to bank or blow out, either of which alternatives is both costly and risky. The strike also injures greatly the trade of the rolling mills, for although we use soft coal many of our customers use anthracite exclusively, and are stopped, waiting events, so that orders to the mills are either countermanded or shipments suspended.

S. FULTON, General Superintendent.

NORRISTOWN IRON WORKS, NORRISTOWN, PENNSYLVANIA.

Wrought-Iron Welded Pipe, Pig, Skelp, Flue and Band Iron.

In our rolling mill we use bituminous coal, and get all we need. In our pipe mill we use egg coal, and have enough on hand to run us this month and next. At our blast furnace, leased to McHose & Sons, they have great difficulty in securing coal. They are now getting from the Wyoming region, and have so far done very well by using three-fourths coke and one-fourth anthracite coal, but will run all coke sooner than stop. They held a consultation with their furnace employees on Saturday, and they all agreed to accept a reduction of 10 per cent. in their wages while the coal trouble lasts in preference to banking the furnace up. The Lucinda Furnace, next to us, banked up on Saturday and the Merion last week. The Montgomery, Swede and Edge Hill furnaces are out of blast. JAMES HOOVEN & SON.

THE MONTGOMERY IRON AND STEEL COMPANY, READING, PA.

As we can get for our furnaces at Danville, Pa., a supply of anthracite coal from either the Wyoming or the Schuylkill regions, the strike in the latter district has not in any way interfered with us, except to create less demand for some of our products. Some of the furnaces in the Schuylkill Valley are substituting coke for anthracite coal.

W. E. C. COXE, Vice-President.

GLASGOW IRON COMPANY, POTTSTOWN, PA. Iron and Steel Plates.

We have experienced no trouble whatever on account of the coal strike; we do not use anthracite coal in any of our mills. The outlook is very discouraging, as the furnacemen say they will

* January 5, 1888.

advance price of pig iron if compelled to use coke, and as the price of pig is now out of all proportion to that of plates and puddle bars we feel there is but little in the future that is encouraging in our line of business. J. HOWELL LEEDS, Sec'y.

THE ELLIS & LESSIG STEEL AND IRON COMPANY, LIMITED, POTTSTOWN, PA.

Nails.

As yet we have felt no ill effect from the strike, and our works have not been interfered with. F. WICKERSHAM.

TOPTON FURNACE COMPANY, TOPTON, PA.
Sheridan Anthracite Pig Iron.

Our stock of coal having become exhausted, we have blown out our furnace and await further developments. In the event of the miners resuming we will blow in at once. ISAAC ECKERT.

PHOENIX IRON COMPANY, PHOENIXVILLE, PA.

The running of our blast furnaces has not been interfered with by the strike. Carrying a large stock of coal (when shipments stopped) we had time to arrange for and receive coke in quantity sufficient to be no longer dependent on coal to keep in blast. The cost of coke is of course greater and its use as a substitute for coal resulted in a high cost for iron produced, without corresponding advantage in increased yield of furnaces. Our usual fuel mixture is three-quarters coal, one-quarter coke.

WM. ST. G. KENT,
Superintendent of Blast Furnaces.

POTTSVILLE IRON AND STEEL COMPANY,
POTTSVILLE, PA.

Steel and Wrought-Iron Beams, Channels, Angles and Plates; Clapp-Griffith Soft Steel Blooms, Billets and Slabs of all Sizes; Pig Iron for Foundry, Forge and Mill Purposes.

The present coal strike in the anthracite region is the most disastrous that has occurred for many years. Being located in the heart of the region ourselves, we have never before been compelled to stop our furnaces, as we have in this case. We have always been able to pick up enough coal in small lots to keep us going, but this time we have not been able to do this. Not only ourselves, but along the Schuylkill Valley and East Pennsylvania many furnaces have been obliged to close up. The strike is most disastrous to manufacturers of iron dependent on anthracite coal as fuel. The uncertainties of delivery of the amount required and the irregular prices asked make the business exceedingly hazardous. C. M. ATKINS, President.

LUKENS ROLLING MILLS, COATESVILLE, PA.

Boiler Iron and Fire-Box Steel Plates.

The strike in the anthracite region does not affect our business in the slightest, except as it may affect the general business of the country, as we use altogether soft coal. The outlook in business is not so good as last year, of course, but we think there will be a fair amount of business done at prices much less remunerative than last year. As soon as the railroad companies place their orders for steel rails, which have been held back for some time, we think an impetus will be given to the whole iron market.

CHAS. HUSTON & SONS.

THE READING BOLT AND NUT WORKS,
READING, PA.

Merchant Bar and Bolt Iron.

The coal strike has not affected us seriously, as we were fortunate enough to secure, before the strike, a pretty large stock of coal. In regard to the outlook in respect to the coal strike and a settlement of it, we have nothing to say, as we do not know what the prospects are.

J. H. STERNBERGH & SON.

THORNDALE IRON WORKS, CHESTER COUNTY,
PENNSYLVANIA.

Boiler and Tank, Ship and Bridge Plates.

As we are not on the lines of the Philadelphia and Reading Railroad, and receive most of our supplies by the Pennsylvania line, on which our works are situated, we do not feel the strike at all, except in an indirect way. We use bituminous coal in our mills for fuel, which is brought to us over Pennsylvania lines, and as yet without any advance in the price of the coal or any advance in freight. The anthracite coal, which we use for fuel in our dwelling-houses, has advanced in price \$1 per ton, and if the strike should be continued any great length of time I presume we will have to pay more for pig metal, owing to the advance in the price of anthracite coal and the inability of some furnaces to obtain a supply. Possibly bituminous coal may be advanced also on account of the scarcity of anthracite. There is also some effect in our business owing to the uncertainty of feeling among business men, which all strikes produce.

WM. L. BAILEY, Treasurer.

WARWICK IRON COMPANY, POTTSTOWN, PA.
Neutral Pig Iron.

We commenced to run on all coke latter part of last week. It is too soon yet to be able to report intelligently how seriously we are affected by the coal strike, except that we are now doing business at a loss instead of a small profit. I will write you early part of next week more in detail. I will say here, however, that if the prices of coal are advanced on resumption of mining we would be little or no better off than now, as the cost of making iron would be more than we are now able to realize for it. We can only afford to run on coke temporarily, and if the necessity is too long continued we will be obliged to blow out. At the same time, if mining can only be resumed by adding considerably to the selling price of coal we will be obliged to blow out anyhow, unless iron should advance in price very materially.

EDGAR S. COOK.

KATHERINE FURNACE, CARLISLE, PA.

Pig Iron.

Our coal supply is exhausted this morning. We will work all coke, and hope to get through until strike is settled.

C. W. AHL'S SON.

MONTGOMERY FURNACE, FORT KENNEDY,
PENNSYLVANIA.

Pig Iron.

We have put our furnace out of blast and sold all our iron to mills in which our proprietors are interested in preference to others making application for what little accumulated stocks we had on hand. We believe that fuel in this valley has been too high, and for the purpose of manufacturing pig iron an advance means idleness to most of our furnaces. We hope that the Reading Railroad Company will adhere to their position and win this fight with the "Knights of Laziness" at whatever cost. Iron making is much curtailed; a stop of any duration will in a great degree absolutely suspend it, while consumption by rolling mills using bituminous coal goes on about the same as before.

J. S. PATTERSON, Treasurer.

MACUNGIE IRON COMPANY, MACUNGIE,
LEHIGH COUNTY, PA.

Pig Iron.

On the afternoon of the 9th inst. we ran out of fuel entirely, obliging us to shut down. Receiving a supply of coal from the Lehigh, we started up on the morning of the 14th. We use 33 per cent. of coke, and now have a supply of fuel to run us two and a half weeks. We still receive sufficient coal to meet our daily wants, but how long this will continue we cannot even conjecture. The cost of producing is

greatly increased by the greater cost of our fuel, and unless pig iron advances in proportion or the strike does not terminate shortly we will go out of blast.

WM. M. WEAVER, Superintendent.

CRANE IRON WORKS, CATASAUQUA, PA.

Pig Iron.

We have now three furnaces out of five in blast, having put two out on Friday last. On account of the poor quality and scarcity of coal our product is not up to our usual standard. We are tiding over by running some coke. The outlook for the future is poor; if there is no change for the better we will be forced to stop.

W. R. THOMAS, Superintendent.

CHESTNUT HILL IRON ORE COMPANY,
READING, PA.

Pig Iron.

The coal strike has affected us and interfered with our work at furnaces to this extent: We banked up one furnace yesterday, and must stop the other one today. We tried to run with 75 per cent. coke; our furnaces, lacking height, became cold in the hearth, and it became a question whether we should stop the furnaces or the furnaces stop us. We carried a stock of coal of 3000 to 4000 tons the whole year, but since the Lehigh strike our regular standing order was not filled by the R. C. & I. Co.; hence, when the strike came we were bare of coal stock. We don't see when this strike will end, or how. My opinion is that in the face of the great injury to business, the immense suffering to thousands and the demand for coal would warrant Mr. Corbin to arbitrate.

JEROME L. BOYER, Superintendent.

CHICKIES IRON COMPANY, CHICKIES, PA.

Pig Iron.

We are not affected by the coal strike, as we have a large stock of coal on hand, received by canal during the summer.

PARIS HALDEMAN, President.

CATASAUQUA MFG. COMPANY, CATASAUQUA.

Bar, Angle and Plate Iron, Merchant Steel, Bars, Steel Plates and Railway Car Axles.

The coal strike in the Lehigh region affects our business both directly and indirectly. Directly inasmuch as a number of our puddling furnaces, and all of our reheating furnaces, are grated to burn anthracite coal, should the strike bid fair to continue we will change all these furnaces to burn semi-bituminous and abandon the use of anthracite. Indirectly we suffer from the effect of using new coals in the blast furnaces supplying our pig iron. The product is not uniformly good, and we suffer in consequence. The outlook, as far as we are concerned, is not bright—cost of production advances—selling prices are declining. We propose doing as little business as possible, and await, with patience, the end of the contest between Knight and Baron.

OLIVER WILLIAMS, President.

LONGMEAD IRON WORKS, CONSHOHOCKEN,
PENNSYLVANIA.

So far work has not been interfered with, as we depend on bituminous coal altogether for fuel. A continuation of the strike would, no doubt, have some indirect effect on work here.

JAWOOD LUKENS.

THE LEHIGH ZINC AND IRON COMPANY,
BETHLEHEM, PA.

Spiegeleisen.

Our furnace has been idle since last September for want of proper fuel to make Spiegel. We do not expect to blow in until the Lehigh strike has been settled.

THE LEHIGH ZINC AND IRON COMPANY,
T. LEWIS THOMAS.

A leading iron maker who does not desire to be personally quoted writes us as follows: "Replying to yours of the 14th, I would say that the coal strike is interfering very much with the blast furnaces in this valley. We have heard of several furnaces banking up and others running on all coke or nearly so, while some talk of blowing out. The effect has been to increase the cost of making iron very much, at a time when there was little or no profit in the business. We have so far had enough coal to run with half coke. We hoped the individual collieries would be permitted to continue at work by paying the advanced wages. Some of them worked on until about a week ago, when the outside influence of the knights obliged them to stop, although the miners were very willing to work. If these collieries could run, the blast furnaces could be supplied with coal enough to keep them going, and the men seem very foolish not to work when they are paid all the wages they ask. Their unreasonable demands antagonize their employers and the whole community. It is becoming now no longer a question of wages but one of the control of your own business, and will have to be fought out regardless of consequences. It looks now as if the strike would be a long one, and considering the low price of iron it would probably be better to blow the furnaces out."

M'CORMICK & CO., PAXTON FURNACES,
HARRISBURG, PA.

We are very favorably located as regards coal supply. Aside from having about three months' supply on hand we can draw from the Wyoming coal field over the P. R. R., and should this fail us we can fall back on all coke. The price of Wyoming coal to us has advanced 25 cents per ton.

CHARLES M. RADER, Manager.

The Protest of the Western Miners.

The Western Iron Ore Association, representing the mines which produce all the ore in the Northwest and Missouri, held a meeting in Cleveland, on Friday, January 13th. The meeting was called almost entirely for the adoption of the appended memorial to Congress, protesting against the removal or reduction of the duty on iron ore. The memorial was unanimously adopted and will be sent to Congress. It is as follows:

The Western Iron Ore Association, representing iron ore producing and transporting interests of the Northwest and of Missouri, beg leave hereby to most respectfully, but most earnestly, remonstrate and protest against the removal of or reduction of the present duty on iron ore.

Iron ore is produced in every part of our country; the aggregate production in 1887 is estimated to have been over 12,000,000 tons. But the mining interests represented by this association alone furnish the ores for nearly one-half of the total pig-iron production of the United States. Engaged in the business are hundreds of thousands of laborers and enormous capitals, which can never be withdrawn, but which must prosper or perish on the spot.

In the ore business of the Lake Superior ore region alone, in the mines of Michigan, Wisconsin and Minnesota, in the railroads necessary for moving their products to the lakes, in the shipping engaged in the lake transportation and in the ore business of the railroads moving the ores from the lower-lake ports to mills and furnaces in the interior and to adjacent States, there are now employed about \$140,000,000 of capital, with all the labor occupation that the use of such an amount of capital involves.

In other sections of the country, East, West and South, are similar, connected

and interdependent industries, whose safety and whose ability to furnish employment to American labor would be seriously impaired or entirely destroyed in the same way by the removal of the duty. The removal or the lowering of the duty would close many American mines.

That the present rate of duty, 75 cents per ton, is insufficient for a reasonable protection to the capital and labor engaged in the working and the development of our American mines is shown by the steady and large increase in importations. About 1,300,000 tons came in from Spain, Africa and Cuba in 1887. Every ton of this imported ore displaced a ton of our home production.

There is no question of quality involved here. Not only is the supply of American ore practically inexhaustible, but it is favorably distributed over the whole country, and every variety of chemical constitution and consequent adaptation to all requirements of the iron and steel manufacture of the country. The importation of foreign ores is simply and only a question of wages in the production here, and abroad.

Our American mines are now competing directly, and, as the importation of 1,300,000 tons last year shows, unsuccessfully, with some of the poorest paid labor in the world. Spanish, African and Cuban ores are produced at a labor cost that would be humiliating and oppressive to the last degree to the American laborer. Such wages we do not ask him to accept.

Upon this proposition American iron ore producers and American iron and steel manufacturers substantially agreed at Crescon, Pa., in 1882, pending the discussion of the metal schedule of the present tariff. The iron and steel manufacturers, by unanimous vote there, said that the duty ought to be 85 cents per ton. The consumers of American ores, therefore, are not asking for the removal or the reduction of the duty. The equalization of the labor cost between foreign and American ores would require the duty to be at least \$1.50 instead of 75 cents.

The iron and steel industries of the United States, for obvious reasons, can never depend upon a foreign ore supply. The reliance for permanently cheap iron and steel to the American consumer must always be upon American ore. That will never fail, provided the development of our mines be not discouraged and retarded by a policy which refuses just and sufficient discrimination in favor of home interests. Iron ore is distinctively a "product"—a product of enormous combinations of labor and capital. Its designation by theorists as "raw material" neither changes its relations to that expended capital and labor, nor can such arbitrary and purely constructive classification to suit certain theories impair its right to the amplest protection.

In view, therefore, of these recited facts and conditions, in behalf of the very large and widely-extended interests we represent, this association begs leave respectfully to renew its declaration against the removal or the reduction of the duty on iron ore.

GEORGE H. ELY, President.

W. D. REES, Secretary.

Some of the directors of the Thomas Iron Company express their opinion that so long as they are paying fair dividends to the stockholders it is not a wise policy to ask that wages be reduced, as is being generally done at the furnaces throughout the Lehigh Valley.

Henry R. Mather, one of the most prominent citizens of Marquette, Mich., died suddenly on the night of the 13th inst. He was a brother of Samuel Mather, of Cleveland, member of the firm of Pickands, Mather, & Co.

WASHINGTON NEWS.

(From Our Regular Correspondent.)

WASHINGTON, D. C., January 17, 1888.

The House Committee on Ways and Means met to-day for the purpose of going over the general features of the proposed measure of revenue reduction. Much to the surprise of the members present the chairman simply asked to have the tariff of 1883 reprinted for the use of the members of the committee. He made no reference whatever to the progress on the bill which it is known he has had in his hands for some days.

There are two reasons for this change of programme. It is understood that the sudden illness of Speaker Carlisle has caused considerable uneasiness in the minds of Chairman Mills and those associated with him in formulating the tariff bill, as they will be unable to go on without the Speaker. To delay at this juncture would be fatal. Another cause of delay is the fact that Secretary Fairchild, who also has a hand in the preparation of the bill, has not quite completed his portion of the work. The bill when through will be in every respect a low tariff measure, with the repeal of the internal tax on manufactured tobacco thrown in on the plea of a compromise.

The action of the House last Friday in rejecting the proposition of Chairman Mills to adjourn over until Monday was practically a vote of lack of confidence and repudiation of his leadership. After voting him down twice some of his friends succeeded in persuading a sufficient number when they were ready to vote with them to help him out of his dilemma. In the English House of Commons an assumed leader who had met with such a rebuke would resign. Chairman Mills, however, will not resign nor in any manner feel chagrined at any treatment he may receive. The chairmanship of Mr. Mills is already pronounced a failure. He has not even the undivided confidence and support of Representatives of his own way of thinking, and he has estranged the protection Democrats.

He is practically in a minority in the House, although assuming to represent the majority. There is now some talk of calling a caucus in order to try to bring the divergent elements of the Democratic party in the House into some kind of harmony on general legislation. The Mills régime will be a *fiasco* whenever the House can get a fair chance at his measure. It is not improbable that it may collapse even sooner. Mr. Mills, however, promises that he will have his bill ready very soon.

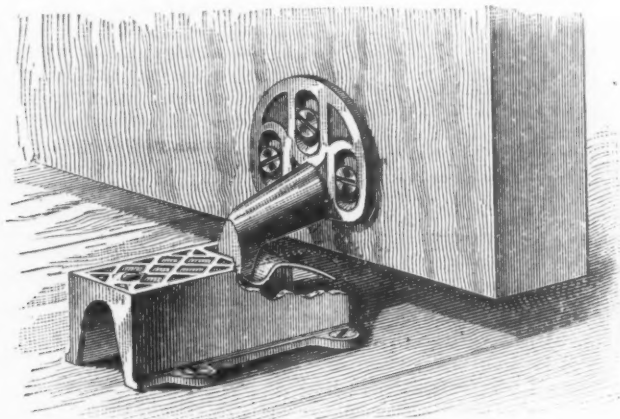
The Senate Committee on Finance at their meeting to-day went over the list of measures relating to the revenue, and directed that they be laid aside until the House shall have taken some action. As revenue measures must originate in the lower branch, the Senate Committee can only act by way of amendment. As soon as Mr. Mills gets his bill in shape the Senate will put such amendments upon it that its author will hardly recognize it.

It will be another week at least before the bill will be introduced in the House. Should Speaker Carlisle's indisposition prove serious, it is not improbable that the introduction of the bill will be indefinitely postponed.

In our editorial note in last issue, in which we discussed the growing use of magnesite as a basic material for lining open-hearth furnaces, a typographical error seriously upset the scope and purpose of the article. *Magnesite* was converted into "magnetite." It is true that the analysis of the rock given probably caused those who are informed in such matters to detect the error, but it may have been seriously misleading to others.

Barlow's Door Stop and Holder.

W. S. Barlow is the inventor and manufacturer of the door stop and holder illustrated below. It will be seen that it consists of two pieces, one attached to the



Barlow's Door Stop and Holder.

door and the other to the floor. The portion attached to the floor is a casting 3 inches long, with a finely tempered flat steel spring extending the entire length of its top, and firmly riveted near the end inside. The portion attached to the door is so arranged that as the door opens it will strike the spring at the desired point and spring it down and slide into the corrugation, which both prevents the door from going further and holds it in its place. It will be seen that the part attached to the door is fastened by three screws, which are placed in slots, thus giving ample room to regulate the power of the spring, according as it is raised or lowered, so that it will strike the spring at the point that gives the right amount of resistance. Other sizes and styles are made for large doors and car doors. Another pattern is also manufactured, in which the part containing the spring is attached to the base board or wall instead of to the floor. These goods are finished japanned, bronzed or nickel plated. Their simplicity, the fact that they can be adjusted and the low prices at which they are afforded are points of advantage alluded to.

The Electrical Distribution of Time.

Many attempts have been made in past years to solve the problem of causing the pendulums of different clocks to vibrate in unison with each other by means of an electrical current periodically transmitted from a central station, but hitherto inventors have not succeeded in obtaining perfect synchronism. In a paper recently read before the Paris Académie des Sciences M. Cornu has returned to the subject and shown analytically that to obtain synchronism in a vibrating system the necessary and sufficient condition is that the free motion of the system shall be a damped vibration, and has also pointed out that the stable condition is obtained more rapidly the greater the amount of the damping. To carry out this in practice it is necessary, if two pendulums are to vibrate synchronously, that they should experience an impulse in one direction, and a retardation in the opposite sense in rigorously the same way. This M. Cornu obtains by fixing a permanent magnet to the lower extremity of the pendulum, the magnetic axis being perpendicular to the axis of the pendulum. An electro-magnet, with an open circuit, is fixed on one side of the pendulum and attracts it at each oscillation. On the other side is placed another electro-magnet, with a closed circuit, which acts simply as a damper and checks

each swing. In this way perfect synchronism can be obtained between clocks a very considerable distance apart, which, indeed, is only limited by the length of line at which the retardation of the current from self-induction becomes sensible. Clocks con-

structed on this principle for the Geographical Department of the French War Office have been successfully synchronized over a distance of 40 miles of a defective telegraph line.

Immel's Lightning Drain Cleaner.

The Sanford Fork and Tool Company, Terre Haute, Ind., have recently added to the line of goods manufactured by them

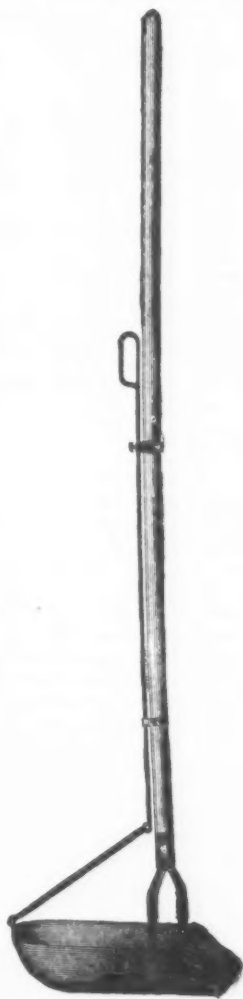


Fig. 1.—Lightning Drain Cleaner.

the Lightning Drain Cleaner, made under Immel's patent and illustrated in the cuts given herewith, of which Fig. 1 gives a general view of the tool, showing it with the handle at right angles to the pan, Figs.

2 and 3 illustrating different positions in which the cleaner can be used. These illustrations indicate the special features of the cleaner and the manner in which it



Fig. 2.—Drain Cleaner Adjusted for Pushing.

can be used. The dirt-pan, which is made of steel, 3 inches deep and 12 inches long, with vertical end in rear, is attached to the handle in the manner indicated and its position regulated by the adjustment shown. This adjustment is secured by an iron rod extending up the handle, by means of which the pan can be put in any position desired, the rod being fastened at any desired point by means of a set-screw. The rapidity and ease with which it can be thus adjusted are alluded to, while refer-

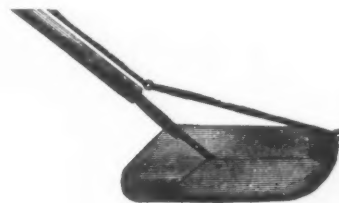


Fig. 3.—Drain Cleaner Adjusted for Pulling.

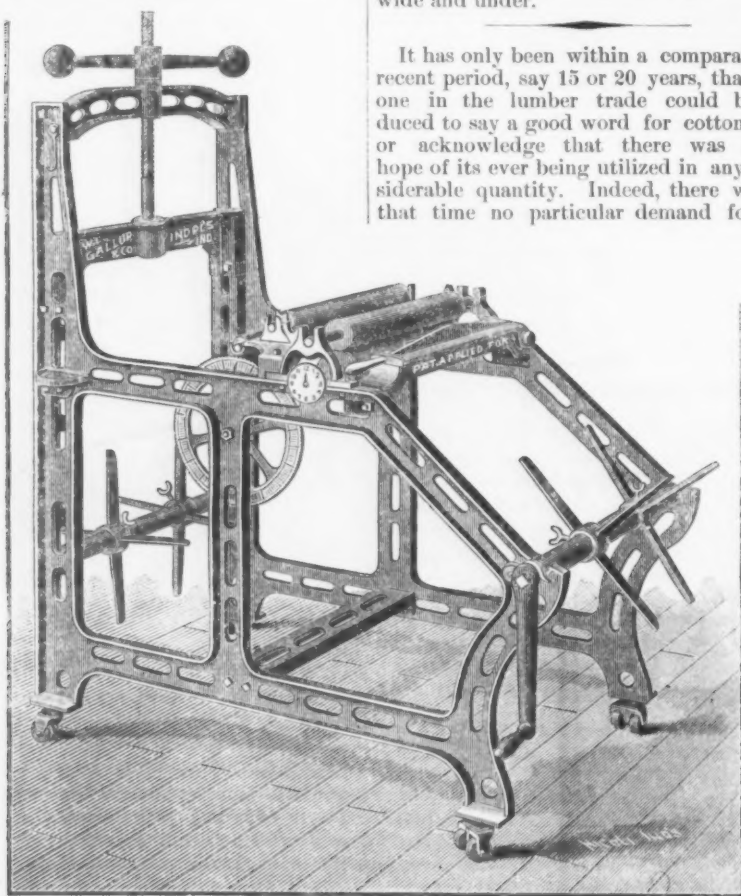
ence is also made to the utility of the cleaner in dipping water and dirt, for letting down tiling in ditching and other uses.

A suit was entered in Common Pleas Court No. 1 at Pittsburgh last week the outcome of which will be watched with considerable interest, as it will decide a point in the matter of tariff. The suit in question was brought by James Leech & Co. against D. O. Barr, Collector of the Port of Pittsburgh, for \$1548.12 overcharge on steel crop ends, imported from Glasgow, Scotland. During last summer the plaintiff received several consignments of steel crop ends, which consist of the waste of rails and blooms in the process of manufacture and are only of use as raw material for re-manufacture. The shipments aggregated 363 tons and, the plaintiffs claim, should have been charged for at the rate of 20 per cent. ad valorem, the same as raw material. Instead of this Collector Barr levied a rate of $\frac{3}{16}$ cent per pound, making \$2426.72 on the whole, which they had to pay to get the material. They claim that the shipments were made with the understanding that the rate was to have been 20 per cent., and appealed to the Secretary of the Treasury, from whom they received a favorable decision, but have not received the rebate from the collector. Suit in consequence has been brought against Collector Barr for \$1548.12, the amount of the overcharge.

Mr. John F. Acheson, who has so acceptably filled the position of secretary of the coke syndicate since its organization, has resigned his position and entered the employ of J. W. Moore & Co., coke operators at Pittsburgh. Mr. E. F. Botsford of St. Louis, has been appointed to succeed Mr. Acheson.

Belt Measuring and Rolling Machine.

W. L. Gallup & Co., Indianapolis, Ind., are putting on the market Gallup's Belt-Measuring Machine, which is represented in the accompanying illustration. It is the invention of W. L. Gallup, and is designed for the use of retailers of belting of all kinds. It will be seen from the cut that the machine is mounted on strong casters, permitting its easy removal to any point desired. It has a sliding frame which may be raised or lowered by means of the screw above it, and by this means heavy rolls may be raised or lowered in different positions. This frame is provided with a series of semicircular rests to sup-



Gallup's Belt Measuring Machine.

port the shaft on which revolve the rolls of belting in the process of measuring. These rests are described as adapted to accommodate the various sizes of cut rolls, and thus save time in lowering or raising the frame. The shaft belonging to the sliding frame has a scale of $\frac{1}{2}$ -inch spaces from the center to one end for centering the roll, which is done by fixing one of the collars half the width of the belting from the center. In some cases the other collar designed for this shaft may be dispensed with. The two small metal rollers are for weighting or friction purposes, and the adjustable guides back of the first friction roller serve to center the belting at the point of introduction into the rolls, to insure the accuracy of which a scale is also provided. The belting passes over and in contact with an iron roller exactly 1 foot in circumference, friction with this roller being maintained by the weighting roller. The end of the belting to be measured is inserted in one of the grooves in the crank shaft, the registering mechanism having been previously adjusted, when, by turning the crank, the operation of unwinding, measuring and rewinding at the other end of the machine is effected simultaneously. Full directions in regard to the operating of the machine are given in the company's

circular, in which they call attention to the following advantages as possessed by the machine: Convenience, economy of space, saving of belting and time, &c. The following points are emphasized: That no floor space other than that required by the stock of belting and the machine itself is necessary, and that by the use of the machine all belting may be accurately measured, while by the use of ordinary measuring tapes or floor scales it is pointed out that a useless waste of belting results from the inaccuracy of such means of measuring. The rapidity and convenience with which belting can be measured are also referred to. Two sizes of this machine are made, No. 1 for belting 24 inches wide and under and No. 2 for belting 18 inches wide and under.

It has only been within a comparatively recent period, say 15 or 20 years, that any one in the lumber trade could be induced to say a good word for cottonwood or acknowledge that there was much hope of its ever being utilized in any considerable quantity. Indeed, there was at that time no particular demand for the

peculiar qualities which have since been found to make its use so desirable. Nor did the first attempts to saw and dress cottonwood increase its popularity or prospects. Its woolly grain made it exceedingly hard to work with the machinery then in use, and occasioned no end of trouble, while the toughness of the wood gave the saw an almost irresistible tendency to run. These difficulties have been overcome in a large measure by the use of improved and stronger machinery, but even now it is not counted an easy wood to work; the saw must be heavy and sharp, and the planing knives in extra good condition, or there will be annoying stoppages.

The Chicago and Northwestern Railroad has made a large reduction in freight rates to points between Chicago or Milwaukee and Duluth, Minn., North Pacific Junction, Minn., Superior and West Superior, Wis. The new figures are from Pittsburgh:—First-class, \$1.05 $\frac{1}{2}$; second, 88 $\frac{1}{2}$; third, 65 $\frac{1}{2}$; fourth, 46 $\frac{1}{2}$; fifth, 35 cents. They were formerly \$1.22 $\frac{1}{2}$, \$1.07 $\frac{1}{2}$, 75 $\frac{1}{2}$, 53 and 40 cents. The new special rates on iron and steel are in carloads 31 and less than carloads 42 cents per 100 pounds.

MANUFACTURING.**Iron and Steel.**

Work on the coke furnace of the Birmingham Furnace and Mfg. Company, at Trussville, Jefferson County, Ala., is progressing vigorously. The casting-house wall is nearly completed, the hoist-house wall is nearly up, the furnace jacket is erected, and jackets for two stoves are nearly finished. The greater part of the plate iron for another stove, and for the bridge, draft stack, &c., is about ready for erection. Sidings and roads to the mines, however, have to be built, so that the furnace will not be ready to make iron before next summer. The company expect to build a second stack after the present one is put in operation. The Hogsetts, of Fayette County, Pa., are the promoters of this enterprise.—*Bulletin.*

Oliver Bros. & Phillips, iron manufacturers at Pittsburgh, have, it is said, the money in bank to pay off the third installment of their indebtedness on February 1. The sum is upward of \$300,000. The last payment was made on February 1, 1887. Two more remain to be paid before the indebtedness is entirely liquidated.

The rail department of the Allentown Rolling Mill Company, at Allentown, Pa., has closed down for an indefinite period, throwing about 150 men out of employment.

The Globe Rolling Mill Company, Cincinnati, have reduced their capital stock from \$450,000 to \$360,000.

The Linden Steel Company, Limited, of Pittsburgh, have finished their contract for rolling armor plate for the United States cruiser Baltimore, and are now engaged on turning out steel plate for the cruiser Newark. This, it is said, is the only firm in the country that can roll a 4-inch steel plate, and, in consequence, have a large share of the Government contracts. The plates weigh 10,000 pounds and are 18 feet long.

The charcoal furnace known as the Carlisle Iron Works, at Boiling Springs, Cumberland County, Pa., is undergoing repairs and will be started up in the spring.

The Pittsburgh Steel Casting Company, of Pittsburgh, cast on Wednesday, the 11th inst., the Bessemer steel gun for the United States Government, mention of which has been made in these columns before.

A committee of the employees of the Crane Iron Company, at Catsauqua, Pa., waited on the superintendent, William R. Thomas, on the 7th inst., and announced their decision not to accept the 10 per cent. reduction on the 15th inst. Orders were at once given to blow out their furnaces. On the morning of the 11th inst. another committee waited upon the superintendent and announced a reconsideration of the decision. It was then agreed that the reduction should not apply to laborers. Thus a strike was avoided.

From the Steelton (Pa.) Reporter, of the 14th inst., we take the following regarding the Pennsylvania Steel Works at that place: The Works of the Pennsylvania Steel Company were in full operation, as usual, this week, and made an average production. The Bessemer department is in fine working order and made its usual output. The open-hearth furnaces are both in operation and working well. With the exception of a few heats they were on special steels. No. 1 blooming mill is kept busy supplying the rail and merchant mills. No. 2 blooming mill is on special plates and had plenty of work. The hammers had one turn entirely on billets and the other on forgings for home use and shipment. The rail mill started on 56s,

sec. 51, a heavy order, and were still rolling them, when our report closed. The foundry was on the usual castings for home use and is very much pushed. The machine shop is also crowded with work and large quantities of new machinery are being turned out. The pattern shop is very busy getting up patterns for new castings. The year 1887 was a busy year for the frog, switch and signal department, and although constantly adding new machinery, the demand for the improved switches, frogs, &c., they manufacture, increased in proportion to the capacity. The shipments for the year were 10,850 steel rail frogs, 5831 switches, 3781 switch stands and 644 crossing frogs, together with a large amount of other track material. The merchant mill is working to its full capacity, the 20-inch train on rails and billets and the 13-inch train on general merchant steel.

Keel Ridge Furnace of P. L. Kimberly & Co., Limited, at Sharon, Pa., has been banked.

The Belleville Steel and Iron Nail Works, of Belleville, Ill., have elected directors for the ensuing year, as follows: James M. Hay, B. Hartmann, J. T. Bruggener, William White, David Nelson, David Nickel and Harry Reis.

The Glendon Iron Company, of Easton, Pa., have notified their employees that, beginning on January 28, the wages of all furnacemen will be reduced about 25 cents per day, or to about the lowest in 12 years. This reduction is on a par with that made to the iron ore miners in December, and affects about 75 men.

No. 5 furnace of the Crane Iron Company, at Catasauqua, Pa., was blown out on the 7th inst. and No. 4 furnace was blown out on the 12th inst.

The Pottstown Iron Company, of Pottstown, Pa., inform us that there is no truth in the rumor that they were about to erect a plant for the manufacture of fuel gas.

Geo. H. Boyd, of the Thos. D. West Foundry Company, of Cleveland, Ohio, informs us that they have just put in a new 80,000-pound cupola, to be run in connection with their two other cupolas at their present plant. Large contracts recently taken for machinery in regular supply for the year 1888 make this increase in capacity necessary. The above firm make a specialty of machinery castings, and can furnish a soft, strong iron especially adapted to that class of work.

Alexander McDonald, recently of the firm of McDonald & Bro., operators of the rolling mills at the foot of Miller street, St. Louis, talks of establishing a new rolling mill in the northern part of the city.—*Age of Steel.*

The United States Iron and Tin Plate Company, of Pittsburgh, with works at Demmler Station, on the Baltimore and Ohio Railroad, have just completed the erection of a sheet mill which will be run in connection with the works.

An informal meeting of the nail manufacturers and nailers of Wheeling, W. Va., and vicinity, was held in the office of the Benwood Iron Works in the above named city on Friday, the 13th inst. The object of the meeting was to devise some means of bettering the condition of the nail market. It was stated during the meeting that small nails were sold in the home market at a lower price than the nail factories can produce them, and the mills cannot run profitably on the larger sizes. The demand for such nails as the nail factories can sell in competition with nails made in tack factories and the wire nails is not sufficient to pay the mills to run. No definite proposition was made by either party, but the whole situation was carefully reviewed and discussed without

any definite action being taken. The men referred the manufacturers to the Executive Committee of the Amalgamated Association, to which body all proposals looking to a reduction or adjustment of wages must be made now that the nailers have become members of that association.

It is rumored that a large rolling mill to employ from 700 to 1000 men will be built in the near future, at Grapeville, on the Pennsylvania Railroad, by Eastern capitalists. The site of the proposed plant is about 30 miles from Pittsburgh. It is also stated that farming implements will be manufactured and that a factory will be built for that purpose.

Thirty-five tubes, each 25 feet long, 16 inches in diameter and $\frac{3}{4}$ -inch thick, are in process of construction at the plant of the American Tube and Iron Company, at Youngstown, Ohio. They are to be used in the construction of the Zalenski cannon to be placed on the new gunboat being built for the Government. Although the tubes are required to stand a hydraulic pressure of 2000 pounds to the square inch, each is tested to a pressure of 4000 pounds.

The Western Steel Company, of St. Louis, have been considering the advisability of putting in Giers soaking pits, but whether they have reached any decision in the matter we are not prepared to say. The steel works are still closed, but the blast furnaces connected therewith are still in active operation. The former may be restarted about February 1.—*Age of Steel.*

The St. Louis Wrought Iron Range Company, of St. Louis, have held an election for directors for the present year, choosing W. W. Culver, L. L. Culver, R. H. Stockton and H. H. Culver.

The blast furnace of the Bellaire Nail Works, at Bellaire, Ohio, produced 4762 tons of Bessemer pig iron in December, with a fuel consumption of 2028 pounds to the ton of iron produced.

The Helmbacher Forge and Rolling Mills Company, of St. Louis, have been awarded the contract of the Missouri Pacific system for links and pins for the ensuing year. They last year, and for several successive years previous thereto, held the same contract for the several roads of this great Southwestern system. Their works are fairly well employed, but there are reported to be no orders for heavy forgings offering.

The Kalamazoo Spring and Axle Company, of Kalamazoo, Mich., have been experimenting for some time with oil as fuel in the manufacture of carriage springs, spring teeth for harrows, &c. Under date of the 12th inst. we received a communication from the company on the above subject, which reads as follows: "We have not changed our entire plant, but are using oil to some extent, and, as far as our experiments have gone, are satisfied that it is the coming fuel, provided the cost of oil is not increased. It gives a most excellent heat in our heating furnaces—more steady, reliable and uniform than can be obtained from coal. We have not as yet used it under our boilers, and consequently are not prepared to say what the result there will be. It is our intention, if our experiments prove satisfactory, to use oil wholly or in part throughout our works—that is, in all our furnaces and under our boilers—and up to the present time our experiments have been very satisfactory."

The capital stock of the Youngstown Rolling Mill Company, of Youngstown, Ohio, has been increased from \$64,000 to \$100,000.

The Pottsville Iron and Steel Company, of Pottsville, Pa., have been compelled to bank their blast furnaces, three in number, on account of the miners' strike. The roll-

ing mills of the above company have sufficient coal on hand to last for some time, and should it be exhausted before additional supplies can be obtained bituminous coal will be substituted.

The Riverside Iron Works, at Wheeling, W. Va., have banked their blast furnace at Steubenville, Ohio, throwing 115 men out of employment.

A boiler exploded in the rolling mill of the Central Iron and Steel Company, Brazil, Ind., on the 9th inst., damaging a part of the mill building, killing two men and injuring a number of others. Most of the employees were at dinner at the time. The boiler was but two years old and had been cleaned and tested on the previous day. It was 26 feet long by 42 inches in diameter, and parted in the middle.

The product of the Colorado Coal and Iron Company for 1887 was as follows:

Coal.....	754,204 tons
Coke.....	150,559 tons
Iron Ore.....	31,573 tons
Pig Iron.....	25,178 tons
Steel Rails.....	16,413 tons
Iron Castings.....	1,330 tons
Cast-Iron Pipe.....	1,206 tons
Merchant Bar Iron, Mine Rails, &c.....	4,670 tons
Nails, kegs of 100 lbs. each.....	45,242 kegs
Spikes, kegs of 150 lbs. each.....	2,521 kegs

The North Chicago Rolling Mill Company's steel rail mill at North Chicago is the only rail mill in this vicinity which has continued steadily at work. On the 16th instant it began on new orders received for this year's delivery, and will continue to run steadily. The company expect to start their South Chicago mill about the 1st of February.

The men in the mills of the Oxford Iron and Rail Company, Oxford, N. J., have struck against a reduction in wages, influenced by that part of the force who are Knights of Labor. The blast furnace and mines are working.

The Lackawanna Coal and Iron Company, manufacturers of rails at Scranton, Pa., have again resumed work. All the men working on percentages have been reduced 10 per cent.. The men working at wages between \$1.15 and \$1.50 per day have accepted a reduction of 5 per cent., while those earning \$1.15 a day and under are continued at the same rate.

Machinery.

The Noblesville Foundry and Machine Company, with a capital stock of \$25,000, have just been formed at Noblesville, Ind., for the manufacture of pipe tools and fittings in brass, also a general machine business. H. L. Smith, of Indianapolis, is president; A. M. Baker, secretary and treasurer, and John Halleran, superintendent. The shops are of brick, of the latest style, and well equipped. The plant consists of the entire plant of the Indianapolis Steel Wrench and Tool Works, and a repair shop removed from Newcastle.

The Ohio Falls Car Works, at Jeffersonville, Ind., are making extensive improvements, among other things erecting a machine shop 80 x 250 feet in length. The company are expending \$20,000 in putting in improved machinery.

Since the enlargement of the extensive foundry and machine shops of the Webster, Camp & Lane Machine Company, that company have been enjoying a business that has kept the large number of hands there employed busily at work, even running overtime in order to meet the demands by reason of orders which come from a wide extent of country, and from the Cleveland firm of the Brown Hoisting and Conveying Company, for whom Webster, Camp & Lane now have six hoist engines ready for shipment to be used on the Cleveland ore docks. There are also 15 more of these hoist engines in the course of construction for the same company, who have the contract for this ma-

chinery from the N. Y., P. and O. Railway Company, and which orders alone will amount to \$250,000. The local company have also a contract from the Lake Shore and Michigan Southern Railway Company for six hoist engines to be erected at points along Lake Erie where iron ore is shipped. At Ashtabula harbor are 10 of these hoisting engines and six more are in course of erection. At Fairport nine are located.—*Akron (Ohio) Beacon.*

The Stearns Mfg. Company, of Erie, Pa., builders of sawmill machinery, engines, boilers, &c., are building new works. Their machine shops are 80x200 feet, two stories; smith shop and engine-room, 50x147 feet; boiler-shop, 80x200 feet; foundry, 60x200 feet; having a total floor area of 80,000 square feet for shop purposes. The Pennsylvania and Lake Shore railways enter the shop yards, and the shops will be fitted out with all the modern appliances, consisting of overhead cranes, turn-tables and all equipment necessary to make the works a model in this line. The capacity of the works will be about doubled, and they will employ about 500 hands.

A natural gas explosion occurred in the machine shop of Adams, Ben & Co., at Findlay, Ohio, on the 14th inst., causing a loss of about \$1000 to the machinery and buildings.

The Rutland (Vt.) Electric Light Company are increasing their plant, and, among other apparatus, have put in a Wainwright feed-water heater. This is the second one they have purchased.

The Hart Mfg. Company, makers of pipe and bolt-threading tools, of Cleveland, Ohio, write us as follows, under date of January 13: "Our time has been entirely taken up with the manufacture of our die-stocks, the demand for which has increased far beyond our most sanguine anticipations. We have purchased an entire new plant of special machinery, and are in shape to turn out better work than ever, and more of it, as well as furnish figures for and manufacture light specialties in tools or machinery." We have received also from our correspondents one of their memorandum books for 1888. It is put up in very attractive and convenient shape and cannot fail to prove useful in many ways.

The Hill Clutch Works, of Cleveland, Ohio, have opened an office at Chicago, at No. 28 South Canal street, in charge of C. A. Burns. This step was rendered desirable by the increase in their Western trade. An agency has also been established at Minneapolis.

The Louisville Machine and Elevator Works, of Louisville, Ky., inform us in a letter, dated January 11, that they now have a number of their ice machines at work in the South and that they are about putting in a plant at New Albany, Ind. They write further that they have purchased a new and larger plot of ground adjacent to the railroad, and will begin erecting new works as soon as the weather will permit. Their large and increasing trade in elevators and ice machines has made their present quarters too small, and they expect to have completed their removal by the middle of the year.

The Chalmers-Spence Company, 419-425 East Eighth street, N. Y., makers of non-conducting coverings, have issued a new catalogue which will prove of some interest to users of such coverings. It is illustrated, and gives price lists, telegraphic code for ordering, &c.

An Albany, N. Y., correspondent writes us under date of January 11: "The largest passenger locomotive ever built in this part of the State will soon be turned out at the Schenectady Locomotive Works, to be used on the Michigan Central Railroad. The engine is a 10 wheeler, having six driving-wheels and a four-wheel

truck. The driving-wheels have a diameter of 5 feet 8 inches, and the cylinders a diameter of 19 inches, with a 24-inch stroke. The fire-box is 8 feet long, 3 feet 6½ inches wide and is placed above the frames. The boiler is of Otis steel, 48 inches in diameter in the smallest ring. It has 247 2-inch flues. The piston rods and valve stems are fitted with United States metallic packing and with Dunbar piston packing. The valves are of the Allen-Richardson balanced type. Two four-wheel channel-iron trucks support the tank, which has a capacity of 3800 gallons, while the tender has a fuel capacity of 8 tons. All the drivers are equipped with the American outside air brakes, and the trucks on the tender are fitted with the Westinghouse air brakes.

The Pulsometer Steam Pump Company, 120 Liberty street, New York, inform us that they recently furnished two of their pumps, a No. 9 and a No. 7, among the largest of their sizes, to the Brooklyn Navy Yard. These, together with a number of additional pulsometers to be sent in a short time, will be used in connection with the new dry dock.

Messrs. Pedrick & Ayer, of Philadelphia, Pa., the well-known builders of special tools, write us that they are boring out in their present positions two blowing cylinders, 46 x 36 inches, for the Bellaire Nail Works, at Bellaire, Ohio, and are facing off 12 valve seats with their portable blower for the Riverside Iron Works, at Wheeling, W. Va.

John A. Roebling's Sons Company, of Trenton, have the making of the cables for the Chicago traction cars. They are 1½ inches in diameter, of the best cast-steel wire, and guaranteed to stand a strain of 194,000 pounds per square inch.

Hardware.

The Auburn Tack Company have been organized at Auburn, N. Y. They consist of capitalists from that city with J. F. Harris, Jr, who has heretofore been prominently connected with the Walkley Hardware Company, Plantsville, Conn. The new company have purchased the machinery, tools, &c., of the Walkley Hardware Company, and have moved the plant to Auburn, and expect to begin its operation this week. The officers of the Auburn Tack Company are J. E. McIntosh, Auburn, N. Y., president, and J. F. Harris, secretary, treasurer and general manager.

The Columbiana Handle Company, of Columbiana, Ohio, are reported to have purchased the entire plant of the Leetonia Handle Company, at Leetonia, Ohio, and will move the works to Columbiana as soon as buildings can be erected.

The Phoenix Caster Company, of Indianapolis, Ind., have let contracts for the erection of a new brick structure, two stories and basement, 120 x 60 feet, largely increasing their present manufacturing facilities.

The American Machine Co., of Philadelphia, for whom John H. Graham & Co., 113 Chambers street, New York, are agents, report a brisk and increasing trade for their goods generally, and are at present specially busy on their freezers and their Automatic Perfection Postal Scales. They are now occupied executing orders for the latter given by the Japanese Government, who, as we have already announced, have adopted these scales for use in their post offices.

The Wayne Works, Richmond, Ind., have been incorporated for manufacturing and vending agricultural implements and other machinery and hardware specialties. They have purchased the works and plant of the Wayne Agricultural Works. The capital of the company is \$75,000, and the directors are Thomas Creamer, Walter W.

Schultz and Edward B. Clements. It is intimated that in a short time a number of men will be at work and the company be in a position to meet the demands of the trade. Mr. Creamer will still remain a member of the hardware firm with which he is connected, but will give his attention principally to the Wayne Works.

Miscellaneous.

Among recently created corporations in the State of Illinois are the following: Bliss Shaffing and Pulley Company, of Chicago; capital stock, \$50,000; for the manufacture of machinery of all kinds; incorporators, S. E. Bliss, G. B. Merrill and W. H. Merrill. American Bolster Spring Company, at East St. Louis; capital stock, \$150,000; for the manufacture of wagon bolster springs; incorporators, J. M. Hunter, H. G. Hagey and W. H. Garrett. Rockford Screen Door and Wire Company, of Rockford; capital stock, \$10,000; for the manufacture of wire and woodwork; incorporators, F. I. Colby, R. C. Hopkins, J. D. Drake and S. A. Corwin. The Peoria Pulley and Wheel Company, of Peoria; capital stock, \$25,000; incorporators, James W. McGill, James W. Hill and E. C. Ely. A certificate has also been filed changing the name of the Rockford Twist Drill and Bit Company, at Rockford, to the Rockford Bit Company.

The Page Belting Company, Concord, N. H., call attention to their wire-sewed leather belting. This method of fastening belts is used extensively in the manufacture of specialties, including their higher grades, the Crown Extra, Hercules Raw Hide, Dynamo, and Light Double belts. This wire sewing consists of a special grade of copper wire, made in a form nearly square, but not exactly; pointed sharp at both ends and clinched. On double belts these wires, or stitches, are placed ¼ inch apart, and on the laps of single belts ½ inch apart. This work is done by a machine which is in part the invention of George F. Page, president of the Page Belting Company. The advantages afforded by this method of fastening are referred to as being that these wire stitches, being set down close into the belt as they are clinched, present practically no metal to come into contact with the pulley, and yet the fastening is complete, for in clinching, a blow tempers the metal to a degree which prevents it from unclenching, while, unlike wire screws, it will not push through and work out, and the clinching on both sides holds it securely in its place. Unlike riveting, it fastens the laps and on the edges of the double frequently as stated, while the rivets must of necessity be placed a considerable distance apart in order that there shall not be too much metal to come in contact with the pulleys, which would cause slipping of the belts and a very unpleasant ringing sound while in operation.

The Union Indurated Fibre Co., 110 Chambers street, New York, as a summary of their work during the season of 1887 in competitive exhibition with other lines of goods, report the following recognitions: Award of merit (highest award), American Exhibition, London; silver medal (highest award), Mechanics' Institute Fair, Boston, Mass; medal of superiority (highest award), American Institute, New York; silver medal (highest award), Fair of New Jersey State Agricultural Society; bronze medal and first premium, Burlington County, N. J., Agricultural Fair; first premium, with diploma, from the following exhibitions: Maine State Fair, Bangor, Me.; Vermont State Fair, Burlington, Vt.; Pennsylvania State Fair, Philadelphia, Pa.; Ohio State Fair, Columbus, Ohio; Georgia State Fair, Macon, Ga.; Piedmont Exhibition, Atlanta, Ga. Such marked recognition from so varied a territory but demonstrates how readily the merits of this ware are recognized.

TRADE REPORT.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, JANUARY 18, 1888.

Speculative pressure in the warrant markets has had a somewhat weakening effect upon values of most classes of Pig Iron. The softening of values, in turn, has served to restrict purchases by consumers to some extent. Consumption is still on a large scale, however, and the fluctuations in prices reflect present speculative sentiment and liquidation rather than any unfavorable turn in the general situation. Prices show 6d to 1d decline on Scotch Pig, 9d on Middlesboro' Pig and 1/ @ 1/6 on Bessemer Pig.

There is still considerable activity in most branches of the Steel trade, and a very firm tone obtains all through. Production is still on the increase. The Lawca are making additions that will cost about £300,000. These include the erecting of a new Steel Rail plant and the addition of a Siemens Steel plant. Steel Rails are an exception to the general market, and have eased off to £4 under increased competition. Steel Billets, on the other hand, are firmer by 2/6, and Slabs and Blooms are held at previous prices.

The Tin-Plate market has been somewhat unsettled during the week, in the face of the formation of the combination of makers and the agreement of those in the combination not to sell at prices below 15/ for B. V. grade Cokes. It is stated on what seems to be reliable authority that some powerful capitalists are behind this combination, and that they are not wholly disconnected with the French Pig Tin syndicate. The combination, it is asserted, will soon change the appearance of the market very materially. At the close of business there were some evidences of the prophecies materializing, and prices show 6d advance over those of a week ago in the face of only a moderate trade.

The break in the price of Chili Bars is attributed to temporary misunderstanding between certain interests identified in the negotiations between the syndicate and prominent mining companies. The precise nature of the trouble does not come to the surface. It is now stated that questions in dispute have been adjusted and that the mining companies and the syndicate are co-operating for an advance in prices. The syndicate has locked up, at the present time, about 40,000 tons of Copper.

In Messrs. James Lewis & Sons' report for the past fortnight the only sales noted of American Furnace Material are 60 tons Precipitate at 15/, to arrive.

Scotch Pig.—The market irregular and unsettled, owing to increased pressure to make sales.

No. 1 Coltness, f.o.b. Glasgow.	52/
No. 1 Summerlee, " "	51/
No. 1 Gartsherrie, " "	48/
No. 1 Langloan, " "	50/
No. 1 Carnbroe, " "	44/
No. 1 Rhotts, " at Leith.	49/
No. 1 Gtengarnock, " Ardrossan.	48/
No. 1 Dalmellington, " "	44/
No. 1 Eglinton, " "	43/

Steamer freights, Glasgow to New York, 6' @ 7/; Liverpool to New York, 7/6.

Cleveland Pig.—Market dull and prices lower, in sympathy with Scotch Pig. No. 1 Middlesboro', G. M. B., 35/; No. 3 do., 32/3, f.o.b.

Bessemer Pig.—Sellers have offered very freely, with the result of a further decline in prices. West Coast brands, mixed numbers, 44/, f.o.b.

Spiegeleisen.—There is only a moderate business, but prices are firm. English 20 % quoted at 74/, f.o.b.

Steel Rails.—Demand light and prices weaker under increased production. Standard sections, £4, f.o.b.

Steel Blooms.—Very little business and prices nominal. We quote at 75/ @ 77/6, f.o.b., for 7 x 7.

Steel Billets and Slabs.—There is a good demand, particularly for Billets, and prices are very firm. Bessemer 2 1/2 x 2 1/2 inch Billets, £4. 5/, and Nail Slabs, £4. 2/6, f.o.b.

Steel Wire Rods.—The market remains firm with demand very fair. Mild Steel, No. 6, quoted at £5. 17/6 @ £6, f.o.b.

Old Rails.—Offerings light and demand from Continent is still good. Tees quoted at £2. 17/6 @ £3, and Double Heads £3. @ £3. 2/6, c.i.f., New York.

Scrap Iron.—Demand moderate and prices unchanged. Heavy Wrought at 50/ @ 52/6, f.o.b.

Crop Ends.—Little doing; prices nominal. Bessemer quoted £2. 5/ @ £2. 10/, f.o.b.

Tin Plate.—Prices higher, but business showing only moderate improvement. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	17/3 @ 18/
IC Bessemer steel, Coke finish	15/ @ 15/6
IC Siemens	15/6 @ 15/9
IC Coke, B. V. grade	15/ @ 15/6
Charcoal, Terne, Dean grade	14/ @ 14/6

Manufactured Iron.—The market remains steady, with a fair business. We quote, f.o.b. Liverpool:

Staff, Ord. Marked Bars	7 10 0 @ 7 12 6
Common "	5 00 0 @ 5 2 6
" Bl'k sheet, singles	6 15 0 @ 7 00 0
Welsh Bars (at Wales)	4 12 6 @ 4 15

Tin.—Fair business, with consumers at easier prices. Straits closed at £166. 10/, spot, and £144 @ £145, three months' futures.

Copper.—The market active and irregular until to-day, when quieter. Chili Bars closed at £75. 5/ @ £75. 10/; Best Selected, £80.

Lead.—Trade moderate and prices rather weak. Soft Spanish, £14. 10/ @ £15.

Spelter.—Less business and prices easier. Silesian, ordinary, £20.

Financial.

OFFICE OF THE IRON AGE,
WEDNESDAY EVENING, JANUARY 18, 1888.

Mid-winter brings with it a storm of unprecedented severity, sweeping through the entire Northwest from the extreme line of northern telegraphic communications as far south as Texas and the Gulf States, blockading railroads and destroying the cattle ranges. It was especially severe in Minnesota, Dakota, Montana and Nebraska, and a temporary paralysis of trade is inevitable, affecting to some extent the Eastern markets. The general outlook for business in the spring, it is conceded on all sides, is cheering. It is not expected, however, that there will be the same ac-

tivity in railway building that has been witnessed for some years past, and a partial reaction in some sections from speculative influences is more than possible. At the same time the general business situation is healthful, with abundant money in prospect, stocks of merchandise nowhere in excess and credits on a solid basis. Reports from our principal commercial centers show that business is quiet, and that the volume of merchandise in course of distribution is ordinary for the season. On the Pacific coast there is much activity. Pittsburgh, too, gives a good report, there being an increase of 41 % in her exchanges for the past week compared with one year ago. The aggregate for 38 cities, including New York, shows only a nominal increase, but exclusive of New York, where speculation has been remarkably dull, the increase is 11.4 %. The miners' strike in Pennsylvania operates as a dead weight to industries through an extensive region, with no prospects of immediate relief, but most of the Iron furnaces and mills are kept in motion by substituting bituminous coal and coke for anthracite. In New York merchants are receiving orders for merchandise to an extent beyond anticipation, and in consequence of the unlooked-for demand prices in some instances are higher. Dry-goods jobbers speak of the presence of buyers largely representing the South, West and the Pacific Coast. In groceries there is more buying than usual at this early period in the year. Speculative operations are carefully avoided.

In the general market business is light in most commodities, and there are few important changes. Breadstuffs are weak, and in some instances prices are easier; export trade light. The excessive shipments of flour since early in November have overstocked foreign markets, and a better demand for wheat is not expected until a reduction is made. Spot cotton on Tuesday advanced 1/4; trading light. Coffee is unsettled. India rubber is irregular, some parties holding above quotations. Lumber does not improve. Oats move slowly. Provisions are firm on larger export orders. In cash lard a fair demand for export. Refined sugars are supported only by the combination. For tobacco there is a stronger market. In petroleum certificates there is a heavy decline.

The Bank of Harlem opened with a capital of \$500,000, Chas. H. Pinkham, Jr., President.

The business failures occurring throughout the week number, for the United States, 258, and for Canada 30, or a total of 288, as compared with a total of 279 the previous week. For the corresponding week of last year the figures were 323.

The Stock Exchange markets have been quiet, but are more active at the close and hardly as strong, with an investment demand for bonds the leading feature. The resolutions in Congress directing an investigation of the Reading troubles received little attention, the interstate law seeming to be inapplicable to the case.

United States bonds closed as follows:

U. S. 4 1/2, 1891, registered	103 1/4 @ 109
U. S. 4 1/2, 1891, coupon	108 1/4 @ 109
U. S. 4s, 1907, registered	126 1/4 @ 126 3/4
U. S. 4s, 1907, coupon	126 1/4 @ 126 3/4
U. S. Currency 6s, 1895	120 1/4 @
U. S. Currency 6s, 1896	121 1/4 @
U. S. Currency 6s, 1897	121 1/4 @
U. S. Currency 6s, 1898	126 1/4 @
U. S. Currency 6s, 1899	126 1/4 @

The weekly bank statement shows a larger increase in surplus reserve than was anticipated. It was known that the currency movement had resulted in an important gain to the banks, but an increase of \$3,637,600 in legal tenders and \$1,808,600 in specie caused an unexpected gain of \$4,964,550 in the surplus reserve average, bringing that item up to \$15,791,275, as compared with \$18,611,800 this time last year. The loans have been

contracted nearly \$4,000,000, which may be mainly attributed to dullness in the stock market. A reduction in the Bank of England discount rate from 4 to 3½%, and a reaction in foreign exchange, due partly to the increased European buying of bonds, has followed the easier condition of money in London. The loan market has been well supplied with funds, and the rates for both call and time loans are lower than for many months. We quote 70 to 90 days' commercial paper 5½%, and four months, 5½ @ 6%. According to the Custom House reports the exports of specie from this port since January 1 are \$816,000 and the imports \$117,000. Last year for the corresponding period the imports amounted to \$2,710,000.

The imports of merchandise at this port last week were valued at \$10,489,600, of which nearly \$3,500,000 represents dry goods. The total since January 1 is \$18,342,000, against \$17,674,000 for the corresponding time last year. The exports for the week were valued at \$4,949,847, against \$6,680,795 for the previous week and \$6,261,634 for the corresponding week last year. The exports from January 1 to date aggregate \$11,630,642, against \$12,244,103 for the like period of 1887 and \$18,373,000 in 1886. The items include 161,000 lb flour, 324,600 bushels of wheat, 15,931 bales of cotton and 4,000,000 gallons of petroleum.

The statistics of the foreign commerce of the port of New York are now complete. The imports are classified as follows, and compared for three years:

	1885.	1886.	1-87.
Dry Goods.....	\$100,542,360	\$115,455,005	\$121,743,445
General mdse.	282,998,096	317,025,025	339,791,150
Specie	17,501,094	38,990,519	40,575,963

Total .. \$401,241,550 \$472,080,749 \$502,110,558

The exports exclusive of specie for the last four years compare as follows:

	1881.....	1886.....	1887.....
	\$330,861,376	\$318,171,611	\$313,020,681
	390,818,693		

For the entire country the imports for 11 months were \$40,250,000 in excess and the returns for December will further reduce this balance of trade.

The new clearing-house system adopted by the New York Produce Exchange went into operation on Monday. The plan is identical in its main features with the clearing-house system of the associated banks. Each broker makes out his clearance sheet showing his purchases and sales and the prices of each, offsetting the one against the other. In case of a debit he must deposit with his sheet a check for the difference against him, and in case of a credit, the clearing-house will give its check in his favor to the amount of the credit, one transaction, in this way, settling up the differences of the day.

The *Mining Journal* prints complete returns from the iron mines of the Lake Superior region, giving their total output for the year ending December 31, 1887, and the gross output of all the mines of the several ranges from the beginning of the industry here to the same date. The output for 1887, including shipments by rail, of ore shipped by local furnaces and lake shipment was 4,667,652 gross tons, this being very much the largest output yet achieved by Lake Superior mines in a single year, the increase over last year being 1,090,295 tons. The shipments from the different ranges in 1887 were as follows; Marquette, Mich., range, 1,834,953 tons; Menominee range, 1,198,743 tons; Gogebic, Mich., and Wisconsin range, 1,237,704 tons; Vermillion, Minn., range, 394,252 tons. The largest increase over last year is shown by the Gogebic mines, their gain being 481,182 tons, the Menominee mines showing a gain of 17,737 tons; the Marquette mines, 200,570, and Vermillion mines, 89,856 tons. The total production of all Lake Superior mines to date is 25,183,595 tons.

NEW YORK.

American Pig.—The market has been quiet and steady, with comparatively few transactions reported. In view of the happenings of the past few weeks the indifferent attitude of consumers has been the source of much comment. The stocks of good Foundry grades are small, and the current production has been so seriously curtailed by the poor working of the furnaces in blast that even the largest consumers must wait for days and weeks to have small orders filled. In the Schuylkill and Lehigh Valleys a number of furnaces have been blown out or have been banked, and a similar fate is threatened in the cases of others should the strike continue. Other furnaces are using growing quantities of coke, and while this probably leads to somewhat greater output on their part the costs are materially enhanced. We print elsewhere a number of letters from producers, showing how their individual interests are affected by the scarcity of Anthracite coal along the Reading and Lehigh Valley railroads. So far as this market is concerned the offerings of iron from Western Pennsylvania and the Mahoning and Skenango valleys are small, and play no important part in shaping the situation. The leading Southern furnaces are reported either fully sold up for the next three months or report little Foundry iron for sale, and have done very little during the past week. The Thomas Iron Company reports sales aggregating 25,000 of No. 2 Plain Foundry to Pipe works at \$17 for 1888 delivery. Prices for usual Foundry grades have not been named, nor are they likely to be until the coal troubles are near a settlement. We continue to quote No. 1 Foundry, \$20.50 @ \$21.50; No. 2, \$19 @ \$19.50; and Grey Forge, \$16.50 @ \$16.75.

Scotch Pig.—The volume of business is moderate, and the market steady. It is reported that one importer has engaged 1000 tons of freight room, but has not bought the iron, believing that the Glasgow market will be lower. We quote Coltness, \$22 @ \$22.50; Dalmellington, \$20 @ \$20.50; Glengarnock, \$21 @ \$21.50; Summerlee, \$21.50 @ \$22; Clyde, \$20.50 @ \$21, and Eglinton, \$19.50 @ \$20.

Bessemer Pig.—The market is very dull and in buyers' favor, with \$18 @ \$18.50 asked for Domestic at Eastern furnaces, and very little demand.

Structural Iron.—The bridge works are reported to be well filled with orders up to spring. They are getting from 4¢ to 4½¢ per lb for Finished Work. Bridge Plates are 2.15¢ @ 2.20¢; Angles, 2.30¢ @ 2.40¢; Tees, 2.75¢ @ 2.80¢, and Beams and Channels, 3.3¢ base, on dock.

Plates.—The market is quiet, with American Tank Iron Plates quoted 2.15¢ @ 2.25¢; Steel Tank, 2.50¢; Steel Boiler Plates, 2.75¢; Flange, 3½¢, and Fire-Box, 4¢. In Foreign Steel the higher prices asked on the other side and the uncertainty of future duty tend to cut off business; 2.20¢ @ 2.25¢ is asked for the heavier gauges of Foreign Steel Sheets, with some 100-ton lots placed.

Billets and Blooms.—Practically no business is reported in Foreign material, which is higher than the figures at which American wires supply the majority of consumers.

Wire Rods.—There is some inquiry for Wire Rods, but the prices asked by importers, \$40.50 @ \$41, are higher than those at which Western mills are selling, so that no business of any consequence is expected until the domestic works are filled with orders.

Steel Rails.—We note sales, including transactions of an Eastern mill with New England roads, aggregating about 5,000 tons not hitherto reported, and a round

of practically closed to-day, making an aggregate of about 20,000 tons all taken by Eastern mills. There are rumors, also, of the placing of large contracts in the West. The returns of the Board of Control show the sales up to January 1st to have been 253,687 gross tons out of an allotment of 848,000 tons. A part of the transactions thus reported are, however, deliveries deferred. By good authorities the total new business in the above is estimated to be 200,000 tons, adopting a liberal construction of the term. Out of this total not less than 145,000 tons were taken by mills east of the Allegheny Mountains, leaving only 55,000 for all the great Western mills, three of which are credited each with about 12,000 tons. There are a number of orders in the market, but the contest for them is sharp. It is a matter which has inspired more confidence in the future of the Rail market that there has been quite an active demand lately for railroad bonds, and that some large issues have been successfully placed of late. This indicates that some of the projects matured may be carried out during the current year, so that the building of new mileage may not show so great a falling off as has been generally believed.

Old Rails.—Consumers are beginning to show more interest, and sales of lots aggregating about 2000 tons of Double Heads for Pittsburgh delivery are reported at a price stated to be equivalent to about \$22.50 here. Manufacturers of Track Supplies have been taking some orders of late, and have considerable business pending, so that they are now buying, and expect in the near future to purchase material. Some of them have been picking up cheap lots for many weeks past. Holders ask from \$22 @ \$22.25 for T's and from \$22.50 @ \$23 for Double Heads.

Scrap.—There is a little more inquiry, and \$20.50 has been bid for a lot of 300 tons for shipment. Holders ask from \$20.50 @ \$21.50 ex store, and \$21 @ \$22.50 on cars or barge.

Rail Fastenings.—There is more inquiry, and negotiations for some large lots of Spikes are pending. The association will hold a meeting in this city next week. We quote Spikes \$2.20 @ \$2.25. We note a sale of 1200 tons of Angle Bars to a New York road.

Philadelphia.

Office of *The Iron Age*, 230 South Fourth St. (PHILADELPHIA, PA., January 17, 1888.)

It is quite impossible to make any satisfactory report of the market, as things are too much unsettled by the strike to permit of anything more than a hand-to-mouth business. Inquiries in regard to the outlook show a similarly mixed condition of affairs, so that no one appears to have any very definite opinions in regard to the future. As regards prices, manufacturers of both Pig and Finished Iron say that they cannot continue on the present basis of cost. The advance in the price of coal, and the inferior quality of such as can be had, make a difference of one or two dollars per ton in cost, while the selling prices have gradually receded until they amount to about a similar loss. This discrepancy will have to be overcome in some way, but how or when is a difficult question to solve. If the conditions which prevail here were general throughout the country the matter might be more easily adjusted, but, being purely local, it is impossible to move without meeting still greater difficulties. If prices of Pig Iron are advanced business at outside points will be lost, and pretty much the same result will be reached in the local market if Finished Iron is advanced. An advance in prices therefore means little or no trade. In view of the strike that is already in progress, talk of reducing wages

and other items of cost seem to be equally impracticable; yet what alternative is there to such a course? Meanwhile, manufacturers are doing the best they can under the circumstances, holding their trade as far as possible and anxiously looking for relief without much idea of where it is to be obtained. As regards the volume of business likely to be met with during the year, opinions are equally unsettled. An enormous amount of work is in sight and under consideration, but it is largely of what may be called a speculative character. That is, it depends upon circumstances. If money is easy and prices moderate, and nothing occurs to destroy confidence, operations which would fill the mills up for months may be commenced very soon, or in the event of anything unfavorable there might be postponements for months or years. At present, everything is in abeyance, and the best judges of the market are unable, or unwilling, to do more than simply maintain their position and wait developments before coming to any decision in regard to the future.

Pig Iron.—Prices are firm, and in some cases a trifle dearer, but there is no general advance, and no specially urgent demand. The uncertainty in regard to the output is causing some little uneasiness, but not enough to force consumers into the market for forward deliveries, although in that respect it might not be easy to place orders, as sellers are using a great deal of caution, and in most cases make their contracts subject to strike. Rumors are current in regard to furnaces being "banked" or "blown out," but while this has been done in a few instances there is a general disposition to continue at work with such fuel as can be had, until something definite can be known in regard to the future. There is a vague impression that if the strike is not soon over prices will advance, so that in either contingency producers wish to keep their plants in condition for such uses as may be required. Meanwhile sales have not been unusually large; a few good sized lots of Gray Forge have been taken at about \$17 delivered, although the few lots now available are held at a little more money. Foundry Irons are firmer in proportion than other grades, and while some ask \$21.50 to \$22 at tide, only choice brands or small lots can be sold at those figures. Some good Irons can be had at \$21, but the supply is becoming smaller every day, and while the price remains the same, it is not always that the Iron can be had. No. 2 is firm at about \$19, with a fair demand and only moderate offerings.

Foreign Iron.—Nothing doing, prices very much beyond what can be reached on this side. Bessemer held at \$20 @ \$20.50, c.i.f., duty paid; 20 % Spiegel, \$27.50 @ \$28 and 10 % @ 12 %, \$24 @ \$25.

Blooms.—Foreign Steel is too high for this market, so that sales are now almost exclusively of the home make. Quotations about as follows: \$31 @ \$32 for Nail Slabs; \$31.50 @ \$32.50 for 4 x 4 Billets; \$36 @ \$38 for Siemens-Martin. Domestic Blooms as follows: Steel, from \$30 to \$35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, \$53 @ \$54; Runout Anthracite, \$45 @ \$46; Scrap Blooms, \$38 @ \$39 "bloom" ton.

Muck Bars.—The demand is rather light and prices somewhat irregular, but in most cases \$30 @ \$30.50 at mill is realized, according to quality of Bars, location of mill, &c.

Bar Iron.—Business cannot be called very active, although as a rule the mills are all pretty well employed. This is due in some measure to old orders, but more, perhaps, to urgency in the demand for small lots, prompt delivery. In this way there is a degree of activity without any

specially large orders being placed, and therefore without any certainty as to the activity continuing. Prices are firmer, however, with 2¢ @ 2.05¢ asked for Best Refined Bars, and about 1.95¢ bid for good-sized lots, with a fair amount of business placed. Skelp Iron has not shown as much activity as was expected, although a few lots have been taken at 1.9¢, with buyers at 1.85¢ for lots of 500 to 1000 tons each.

Plate and Tank Iron.—The feeling is somewhat uncertain in this department, although some fair-sized orders have been placed for shipbuilding and similar purposes. Mills are fairly well employed, but there is a good deal of competition for business, which keeps the market in a feverish condition, with more irregularity in prices than usual. Nominal rates are as follows, but on desirable orders there is a good deal of cutting: Ordinary plate, 2.15¢ @ 2.20¢; Tank, 2.20¢ @ 2.25¢; Shell, 2.6¢ @ 2.7¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.4¢ @ 2.5¢; Shell, 2.8¢; Flange, 3¢ @ 3½¢; Fire-Box, 3½¢ @ 4½¢.

Structural Iron.—There is not a great deal of new business coming on the market at present, but the mills are nearly all busy on old contracts. Some very important things are in contemplation, but in the present unsettled condition of affairs it is not likely that any active measures will be taken to push them forward. For the time being, therefore, manufacturers just about maintain their position, taking in as much new business as they finish up on old contracts, and holding prices as they have been for some time past—viz., 2.25¢ @ 2.35¢ for Bridge Plate; 2.3¢ @ 2.35¢ for Angles; 2.8¢ @ 2.9¢ for Tees and 3.3¢ for Beams and Channels.

Sheet Iron.—There is a good deal of inquiry for Sheet Iron for summer delivery, but manufacturers are not anxious for anything so far ahead. Early deliveries can be had at about the following quotations, with the usual concessions on large lots:

Best Refined, Nos. 26, 27 and 28.....	3½¢
Best Refined, Nos. 19 to 25.....	3¼¢
Common, ¼¢ less than the above.	
Best Bloom Sheets, Nos. 26 to 28.....	4½¢ @ 4¾¢
Best Bloom Sheets, Nos. 22 to 25.....	4 @ 4¼¢
Best Bloom Sheets, Nos. 16 to 21.....	3½¢ @ 3¾¢
Blue Annealed.....	2.8 @ 3 ¢
Best Bloom, Galvanized, discount.....	60 ¢
Common, discount.....	65 ¢

Steel Rails.—Business continues in the same dull and lifeless condition as recently reported. At least one-half of the capacity is idle, and the balance working along in a kind of half-hearted day-to-day style, ready for anything that may turn up later on. Prices are steady at \$32 @ \$33 at mill, and some orders are being taken, but large buyers still hold back, as though they expected better terms later on. The chances do not seem favorable for that, however, and several of the mills will doubtless remain closed unless business can be had at quoted rates.

Old Rails.—The numerous inquiries reported a week ago do not appear to have resulted in much business as yet, although holders show increasing firmness. Bids of \$23.50 are made for T's, delivered at mills in the interior, but \$22 @ \$22.50, Philadelphia, are the best figures named by those who have them for sale.

Scrap Iron.—The movement continues to be large, and full prices are realized for good qualities. A sale of 1800 tons Finished Plates was made for an interior delivery at about the rates quoted below, say: Cargo lots No. 1 Scrap, \$21 @ \$21.50; carload lots, \$22 @ \$22.50, or for choice lots \$22.50 @ \$23. No. 2 do., \$14 @ \$15; Turnings, \$15 @ \$16; Old Car-Wheels, \$17.50 @ \$18; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$16 @ \$17; do. Borings, \$11 @ \$12; Old Fish Plates, \$26 @ \$27.

Wrought-Iron Pipe.—Business remains in about the same condition as last re-

ported, viz.: unsettled and a tendency toward lower prices. Discounts are quoted as follows: Butt-Welded, Black, 47½ %; Butt-Welded, Galvanized, 37½ %; Lap-Welded, Black, 60 %; Lap-Welded, Galvanized, 37½ %; Boiler Tubes, 52½ %.

Nails.—Sales of Iron Nails during the past week have been light, and, while there is no radical change in price, mills seem determined to go no lower, and, rather than do so, will refuse orders. Price is quoted at \$2.10 @ keg, and, as a rule, this quotation is being well maintained.

[By Telegraph.]

The Philadelphia Rolling Mill Association, at their yesterday's meeting, agreed on 2 cents for Bar Iron as the basis for labor, to commence first Monday in February.

Chicago.

Office of The Iron Age, 95 and 97 Washington St., Chicago, January 16, 1888.

Pig Iron.—Although many buyers are holding off at present in the hope that prices will be lower, yet necessity has driven enough others into the market during the past week to make quite a fair demand for all kinds of Iron. Good sales are reported of Lake Superior Charcoal, Ohio Softeners and Southern Coke. For strong Foundry Iron there has been but a limited demand as to the higher numbers, but buyers have endeavored to pick up lower grades whenever they had an opportunity to make good terms. Southern Coke is not influencing prices here so much as it did a short time since, probably because more of it than usual is being diverted to Eastern markets on account of the labor troubles in the Anthracite coal regions restricting the local production of Pig Iron. The Southern Iron now being offered here is held at firm figures, even the off grades, which can usually be had at concessions. Hocking Valley Silvery Iron, however, is something of a disturbing element, competing with regular Ohio Softeners, being quoted at \$19.75 @ \$20.25, cash, f.o.b., Chicago, which is considerably lower than the price of the Iron which they displace. Standard brands of Lake Superior Charcoal are held as firmly as was reported last week, the only concessions coming to light being those made on sample carloads to large consumers, who are expected shortly to place heavy orders. The starting up of the new Ashland Furnace, whose product will be mainly marketed here, will soon increase the supply of Lake Superior Charcoal, but what effect this will have on prices remains to be seen. From the condition of stocks in consumers' hands, and the volume of inquiries now being received, sellers look for an early renewal of activity in the Pig-Iron trade. We continue to quote as follows, for cash, f.o.b. Chicago: Lake Superior Charcoal, Nos. 1, 2 and 3, \$22; Alabama Car-Wheel, \$26; Southern Charcoal Foundry, \$21.50 @ \$22.50; Jackson County Softeners, No. 1, \$21; American Scotch, No. 1, \$20.50 @ \$21.50; Lake Superior Coke, all Ore, No. 1, \$20 @ \$21; No. 2, \$19 @ \$20; Cinder Mixed, 50¢ less; Coke Bessemer, run of furnace, \$20 @ \$21; Southern Coke, No. 2, \$19.50 @ \$19.75; No. 2½, \$19.

Bar Iron.—A good week's business is reported, with the prospects very favorable for much more trade in the near future. Jobbers are stocking up, and car specifications are coming forward. Orders for several thousand cars were placed last week, and there are more to follow, which will cause a heavy consumption of Iron in that direction. Common Iron has been sold at 1.75¢ @ 1.80¢, from mill, f.o.b. Chicago, according to quantity, with some of the largest sales at a shade lower. Good

Muck Bar Iron is still quoted at 1.90¢ @ 1.95¢, from mill. Store prices range from 2¢ to 2.20¢, according to quantity and quality.

Structural Iron.—Some bridge work is in sight, but trade generally is quiet. Prices on mill orders, f.o.b. Chicago, are as follows: Angles, 2.35¢ @ 2.40¢; Tees, 2.75¢; Universal Plates, 2.55¢ @ 2.60¢; Beams and Channels, 3.4¢. Store prices are $\frac{1}{8}$ ¢ @ $\frac{1}{4}$ ¢ higher than these rates.

Plates.—Mill orders have been scarce, while Store trade has been very good. From store quotations are as follows: Heavy Sheets, Nos. 10 to 14, 2.80¢; Tank Iron, 2.75¢; Tank Steel, 3¢; Shell Iron, 3.25¢; Shell Steel 3.50¢; Flange, 4¢; Fire-box, 4.75¢.

Sheet Iron.—Mill sales are being made in a small way at 3.10¢, f.o.b. Chicago, for No. 27 Common Black, with some inquiry in anticipation of the usual spring trade. Store quotations are still 3.50¢ for No. 27, with concessions for quantity.

Galvanized Iron.—There is no change to report. Store prices are 60 ¢ off on Juniata, with 60 and 5 ¢ off on Charcoal, with concessions for quantity.

Merchant Steel.—A fair store trade is reported, but large orders are not numerous. Quotations are as follows: Bessemer Bars, 2.35¢; Tool Steel, $8\frac{1}{2}$ ¢ @ $9\frac{1}{2}$ ¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.25¢; Open-Hearth Spring, 3.30¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 11¢.

Steel Rails.—From present appearances it seems quite likely that business will soon become active at this end of the line. Railroad companies are gradually becoming more inclined to place their orders for the year's requirements as they learn what is taking place in the East. Last week upward of 20,000 tons were entered by the local manufacturers. One order for several thousand tons went East, however, which it had been expected would be placed here. The price quoted is still \$35, but there is a drooping tendency.

Old Rails and Wheels.—Some transactions in Old Iron Rails have taken place within the last few days, but terms were private, except of one lot of 500 tons, which brought \$21.25. Old Steel Rails, long lengths, have been sold for \$18.50. Old Car-Wheels are in demand at \$20.50, but \$21 is asked.

Scrap.—Choice Forge Scrap is much less abundant than it was, and some holders are asking higher prices. One dealer refused \$21 for a large quantity, expecting to be able to get \$22 for it, if not more. Inquiries are coming in more freely, and matters are looking more encouraging for those who have Scrap to sell. We quote carefully Selected Scrap as follows, per net ton of 2000 lb: Railroad Shop or No. 1 Forge, \$21; Track, \$19; Mill Iron or No. 1 Wrought, \$16; Light Wrought, \$9.50 @ \$10.50; Machinery Cast, \$16; Stove Plate, \$11.50 @ \$12.50; Cast Borings, \$10 @ \$10.25; Wrought Turnings, \$12.75; Axle Turnings, \$14.50; Coil Steel, \$15; Leaf Steel, \$16; Locomotive Tires, \$16.50 @ \$17; Mixed Steel Scrap, \$12; Horseshoes, \$20 @ \$20.50; Axles, \$26. For Mixed Country Scrap \$13 @ \$14 is quoted.

Barb Wire.—A fair movement is reported among heavy buyers, and manufacturers are beginning to run their works more briskly. From the smaller trade the demand is light, the time not having arrived yet for them to purchase to any considerable extent. Large quantities are quoted by manufacturers at 3¢ @ 3.15¢ for Painted, according to quantity, while jobbers quote 3.25¢ to the small trade, with concessions for quantity. Galvanized is sold at the usual $\frac{1}{4}$ ¢ advance on Painted.

Nails.—An active demand for Steel Cut Nails is reported by manufacturers, a number of sales having been made of 1000 to 5000 keg lots. The Wheeling manufacturers are in some cases withdrawing from the market to await the outcome of their controversy with the workmen over wages. Prices are firmer than they were, but no higher, the usual rate quoted by manufacturers being \$2.05, f.o.b. Chicago, from factory, this price being shaded only on very favorable specifications. Plenty of inquiries are reported from prospective buyers. Jobbers report a fair demand, with a little improvement over the preceding week. Their price for small lots of Steel Cut Nails is \$2.20, with 10 ¢ off for carloads. Wire Nails are somewhat quieter than they were, the manufacturers endeavoring to get \$2.70. Jobbers quote \$2.90, which is shaded for quantity.

General Hardware.—Trade is gradually making its way through the customary channels, but in some lines there is a renewal of the activity which was so noticeable before the holidays. Prices are steady, with an upward tendency, but there is no feature specially worthy of note.

Pig Lead.—No business is reported of a character to test values. Common and Soft Missouri brands have been offered from second hands. Quotations range from 4.60¢ to 4.95¢, the higher price being for Corroding, future delivery. Consumers have stocks to run them into February.

Rogers, Brown & Co., of Cincinnati and Chicago, have been appointed sole agents in all markets for the sale of Pig Iron made by the Ashland Iron and Steel Company, of Ashland, Wis. This new brand of Lake Superior Charcoal Pig Iron will be named Hinkle. W. W. Backman is resident agent of the firm at 98 Dearborn street, Chicago.

The Aetna Iron and Steel Company, of Bridgeport, Ohio, for whom George G. Spencer, 115 Dearborn street, Chicago, is agent, have put in the necessary machinery for its manufacture, and are now selling Patent Straightened Steel Tire. They are prepared to execute orders with dispatch.

The Fowler Rolling Mill Company, the Fowler Steel Car-Wheel Company and the Tin Mountain Company have removed their offices to a fine suite of rooms, Nos. 65, 66 and 67, in the Adams Express Building, 185 Dearborn street, Chicago, the removal being rendered necessary by the expansion of their business. The Fowler Steel Car-Wheel Company have recently received a number of orders for their new Wheels, both for the 33 and 42 inch size.

Pittsburgh.

Office of The Iron Age, 77 Fourth avenue, }
PITTSBURGH, Pa., January 17, 1888. }

There has been no material change in the general Iron situation during the week past; while it is still generally reported slow and unsatisfactory, the indications are that there will soon be a change for the better, and the outlook is generally regarded as being favorable for a good spring trade. It has been alleged here for some time past that the firm of Carnegie, Phipps & Co. had been engaged in bearing the Raw Iron market for the purpose of influencing Ore, Labor, &c. Mr. Andrew Carnegie, while admitting that his firm has been selling pretty freely of late, denies that there was any object in view excepting that they did not want to blow out their furnaces. Mr. Carnegie makes the point that everything in the Iron and Steel line was pointing downward, and that Pig Iron, as a matter of course, had to follow suit. It may be remarked that the firm in question exert a very strong influence upon our market and their

actions are watched very closely in consequence. It is claimed that this firm in their various enterprises employ 10,000 men.

Pig Iron.—The dullness noted for some time past still continues. Consumers, as a rule, are still refusing to buy excepting as their immediate actual wants require; hence the demand is chiefly for small lots. However, the feeling generally obtains that the market is as low as it will be. City furnaces are refusing to make any further concessions, and furnaces at a distance can do better at home or at other points than in this market. We are cognizant of furnaces at interior points east of Pittsburgh, the product of which usually comes to this market, having some large sales to Philadelphia buyers, and at a price that netted fully 50¢ $\frac{1}{2}$ ton more than the same Iron would be sold at in this market. Some of our city furnaces are refusing to sell at present prices, which they aver afford no margin for profit, and it is very evident that there will soon have to be a change one way or the other. There has been very little change in prices for some weeks past, and while, as already intimated, there are few if any sellers cutting on prices quoted, consumers continue to hold off, apprehensive that possibly there may be a further decline, being anxious to keep themselves in position to take advantage of the same should it occur. We quote as follows:

Neutral Gray Forge	\$16.50 @	\$17.00 4 mos.
All Ore Mill	18.00 @	18.50 "
White and Mottled	15.50 @	16.00 "
No. 1 Foundry	19.00 @	19.50 "
No. 2 Foundry	18.00 @	18.50 "
No. 3 Foundry	17.00 @	17.50 "
Charcoal Foundry	22.00 @	25.00 "
Cold Blast Charcoal	27.00 @	30.00 "
Bessemer Iron	19.00 @	

So far as we can learn there have been no sales of standard brands of Bessemer below \$18.50, cash, to \$19, four months. We are advised of sales of White Bessemer at \$16.50 and Mottled do. at \$17, both cash. So far as we can learn there have been no sales of standard brands of Gray Forge below \$16.50, cash, to \$17, four months, and some furnacemen are refusing to accept the prices quoted.

Muck Bar.—There has been little or no change in the situation during the past week; business continues light, while prices remain unchanged at \$29 @ \$29.50, cash. We are advised of a sale of 1000 tons at \$29.25, cash.

Manufactured Iron.—Orders for Finished Iron continue to come forward slowly, but the indications are that business will soon commence to improve. The feeling generally obtains among manufacturers that there will be at least a fair average spring trade, and the probability is that it will be above an average. It may be stated that a good many of the new railroads that were built last year will be equipped this year, and while the rail mills may not have so much to do, locomotive and car builders will be very busy, which, of course, means a large consumption of Iron and Steel. Some of the car-builders, it is said, have sufficient contracts booked now to keep them busy for a year or more. Then, the indications are that the wants of the general trade will be fully up to those of 1887.

Nails.—There has been some inquiry of late, and the market is firmer; jobbers, apprehensive of an advance, have commenced to feel around, and there is reason to believe that if makers were so disposed they would obtain some good-sized orders by making a slight cut on present prices, which they are refusing to do. We continue to quote at \$2, 60 days, 2 ¢ off for cash, with a rebate of 10¢ $\frac{1}{2}$ keg on carlots and upward. The Wheeling and Ohio Valley manufacturers held a meeting at Wheeling last Wednesday and reduced the card from \$2.25 to \$2, making it the same as adopted a few weeks ago by those of Pittsburgh.

The price is low and affords but little, if any, margin for profit, and the market is steady, with indications pointing to an early advance, unless cost of production can be reduced, of which there is but little prospect.

Wrought-Iron Pipe.—Trade continues dull, as it always is during the winter season, and there is not likely to be much improvement until toward spring. There will be a meeting of the Pipe Association at Philadelphia on Thursday of this week, at which it is intimated some action will be taken with a view to restricting production. While there has been no change made in the combination rates, they are being shaded somewhat and we quote accordingly: Discounts on Black Butt-Welded Pipe, 50¢; on Galvanized do. 42½¢; Black Lap-Welded, 62½¢; Galvanized do., 50¢; Boiler Tubes, 57½¢ off; Casing, all sizes, 52½¢; 2-inch tubing, 13¢ per foot; 2-inch Line Pipe, 12¢.

Old Rails.—The market is firmer, with an increasing demand, and sales reported show an advance of 25¢ @ 50¢ per ton, and some holders are holding for a still further advance. Sales, foreign Tees at \$24.25 @ 24.50, and Double Heads at \$25.25. An Eastern operator who is in the city reports having been offered \$24.50 yesterday for a lot of 1000 tons Tees. We are advised of a sale of 150 tons of old steel rails at equal to \$23, Pittsburgh delivery.

Steel Rails.—So far as we can learn there is little or nothing here; well-posted parties predict that there will not be as many Rails wanted this year as there was in 1887. Prices quoted nominally at \$32.50 @ \$33, cash, at mill.

Billets, &c.—The market for Bessemer Steel Billets is much firmer, and while there have been no sales reported at that figure as yet, sellers are now asking \$30, or an advance of \$1 per ton. Foreign Billets cannot be laid down here in Pittsburgh under \$32.50 @ \$33, and this being the case it is not strange that an advance is being demanded. There is not much inquiry for Nail Slabs, but they, too, will doubtless advance as they both sell freely close together. Rail Ends are quoted nominally at \$19.50, and Bloom Ends at \$19.

Railway Track Supplies.—There is but little doing at present, but an increased trade is looked for next month. No change in prices.

Old Material.—Sale, 150 tons, No. 1 Wrought (Railroad) Scrap at \$20, net ton; Wrought Turnings quoted at \$14 @ \$15; Car Axles, \$27 @ \$28; Cast Scrap, \$16.50 @ \$17, gross; Cast Borings, \$12 @ \$13; Old Wheels nominal at \$19.50 @ \$20. There appears to be no demand for the latter in this market.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts., Cincinnati, January 16, 1888.

Pig Iron.—The market remains in a somewhat unsettled condition, with an easy tone and irregular prices. Notwithstanding the reports that many leading companies in the South have booked large orders for many months ahead, there is still no apparent effort on the part of producers to secure further orders at current prices, yet in many localities it is claimed that the cost of production is now greater than when the prices realized were 50¢ @ \$1 higher. Why, under these conditions, there should be pressure to sell iron for future delivery, and prices cut, it is difficult to explain, but such seems to be the fact; yet there has been no radical change in the temper of the market from a week ago. Buyers have continued to make many inquiries, but have not made large purchases; yet the

aggregate sales have been considerable. Among the larger transactions have been 1000 tons No. 1 Mill Iron at \$17.50, four months' time; 600 tons do. at \$17.25 cash and several other smaller lots, aggregating 3000 tons; 1000 Lake Superior Charcoal at \$23.00, four months' time, and 2000 tons No. 1 Coke Foundry Iron at about \$18.25 cash here. Other sales of various kinds and grades have been made, but only in a few hundred-ton and carload lots. If any large transactions are about to be consummated nothing is said about them. The prices current here at the close, on cash basis, f.o.b. cars Cincinnati, are as follows:

Hot-Blast Foundry.

Ohio Southern Coke, No. 1	\$20.00 @	\$20.50
Ohio Southern Coke, No. 2	18.50 @	19.00
Ohio Southern Coke, No. 2½	18.00 @	18.50
Ohio Soft Stone Coal, No. 1	20.00 @	20.50
Ohio Soft Stone Coal, No. 2	18.50 @	19.50
Mahoning Valley	20.50 @	21.00
Hanging Rock, Charcoal, No. 1	22.00 @	24.00
Hanging Rock, Charcoal, No. 2	22.00 @	23.00
Tennessee and Alabama, No. 1	21.00 @	21.50
Tennessee and Alabama, No. 2	19.50 @	20.50

Forge.

Strong Neutral Coke	17.00 @	17.50
Mottled Neutral Coke	15.50 @	16.00
Cold Short	16.00 @	17.00

Car-Wheel and Malleable Irons.

Southern Car-Wheel	23.00 @	24.00
Hanging Rock, Cold Blast	24.00 @	25.00
Lake Superior Car-Wheel Malleable	22.50 @	23.00

Manufactured Iron.—The market has remained quiet but firm. Coal is now plenty and low enough to stimulate industry, but yet the prices current are high compared with many former years at this season. The money market is in an easier and more comfortable condition, but this fact seems to have but little influence upon trade at the moment.

Nails.—There has continued to be a moderate jobbing demand and a steady market; 10d @ 60d sell at \$2 @ \$2.10 per keg, and other sizes at proportionate rates. Steel Nails sell at \$2.10 @ \$2.20 and Steel Wire Nails \$3 @ \$3.10 per keg.

Old Rails and Wheels.—The market for Old Rails has been heavy with prices lower, sales being made at \$21 during the week, but Old Wheels have preserved, a steadier tone with moderate sales at \$20 @ \$20.50 per ton.

Chattanooga.

Office of *The Iron Age*, Carter and Ninth Sts., Chattanooga, Tenn., January 16, 1888.

Notwithstanding cold rains have prevailed during the entire week business has continued to move along with usual activity, and there appears to be no letting down in any of the different lines of trade. Farmers have commenced to inquire about what they will require when they commence operations, which will be in about 30 days. The high tides of the rivers have thrown an unusual activity into the lumber business, and all the mills are in full operation. The railroad lines are still encumbered with surplus freights, and from present appearances this condition of affairs will continue for some length of time. All the manufacturers of Sash Doors and Blinds are running to their fullest capacity on stock to be prepared to meet the spring demand, which is anticipated to be very large.

Pig Iron.—There are no particularly new features developed in this line. The demand has shown a marked increase, as will be shown from a remark of the owner of one of our largest furnaces. He said: "I received more telegrams the three first days of this week than I received in a month previous." Prices have no doubt stiffened up from 50¢ to 75¢ per ton on all desirable goods. There has been quite an unusual demand for Open Bright and Silvery Iron, and the prices of those brands are now about the same as No. 2 Foundry, the inquiries coming mostly from Stove foundries. Judging from the orders that are being received from our Southern

foundries, they no doubt are having a good run of work. Quite a number are contracting for their wants in this line for some three or four months ahead. The Stove foundries are all running full, and anticipate a full run of work for the entire year.

Louisville.

LOUISVILLE, KY., January 16, 1888.

Pig Iron.—There has been but few sales during the past week, consisting of lots of 50 and 200 tons. The parties who have been buying so heavily are now entirely out of the market, not that they have purchased all the Iron wanted, but because they wish to judge more fully of the tendency of the market. The demand for Old Wheels and Rails has increased slightly, Old Rails being worth \$22 and Old Wheels have been sold at \$19.75, on cars at Louisville. Cutting in prices by some of the Southern furnaces has driven quite a number of buyers off from the market, as they are in doubt which way prices tend. There has been considerable surprise expressed at the low prices offered, as buyers were not expecting the market to be so much in their favor. This selling, however, at low figures has not been general; but several furnaces thought it was the proper time to sell and consequently took orders regardless of price, in some instances selling for \$1 a ton less than the general market price. A number of leading furnaces, however, did not follow suit, and their action we think will lead to good results, as the tone of the market is steadier, and the company controlling the largest number of furnaces in the South have advanced their prices from 25¢ to 50¢ per ton. Current quotations:

Southern Coke, No. 1 Foundry	\$19.50 @	\$20.50
" No. 2 "	18.00 @	19.50
" No. 2½ "	17.00 @	19.00
Hanging Rock, Coke, No. 1 Foundry	19.50 @	20.50
Hanging Rock, Charcoal, No. 1 Foundry	22.50 @	24.00
Southern Charcoal, No. 1 Foundry	19.50 @	21.50
Silver Gray, different grades	16.00 @	18.00
Southern Coke, No. 1 Mill, Neutral	16.50 @	17.50
" No. 2 "	15.75 @	16.75
" No. 1 " Cold Short	15.75 @	16.75
White and Mottled, different grades	15.00 @	16.00
Southern Car-Wheel, standard brands	24.00 @	25.00
Southern Car-Wheel other brands	22.00 @	23.00
Hanging Rock, Cold Blast	24.00 @	25.00
Hanging Rock, Warm Blast	20.00 @	21.00

W. B. BELKNAP & CO., Louisville, report as follows, under date of January 16, 1888: Business for January opens with most encouraging volume. Prices have been more or less disturbed by certain apprehensions that something would or ought to happen with the New Year—rather singular fact when one reflects on it. Iron and Iron Goods have declined enough to insure us against importation for the time being, at least, and that is one comfort. It is a mistake to suppose, however, that a large majority of people are going to discontinue buying, or that they cannot pay for what they want. As we say above, trade is good and promises to continue so, but there is little danger that the consumer is not going to get his full money's worth.

Bar Iron.—The rise in the Ohio River has brought down a necessary supply of Coal to open up factories, many of which had closed for want of it. This makes the supply of the market free, and also opens the lower river markets to up-river mills, and affords general cheap transportation. Pressure, too, has been taken off the railroads thus, and we fancy there will be little more complaint about scarcity of cars for this part of the country at least.

Nails.—Nails are beginning to sell freely as the building season approaches, but as the trade is so divided between Cut Iron, Cut Steel and Wire, none of them individually show up very largely in the list. The article in *The Iron Age* on the number of Wire Nail factories and Ma-

chines in operation must have opened the eyes of a number of those who fancied the industry to be in its infancy, and to admit of illimitable expansion.

Wire.—There is of late remarkably good trade on both Plain and Barb Wire—so far no improvement in the price has been realized.

St. Louis.

ST. LOUIS, January 16, 1888.

Pig Iron.—The past week has been an active one in this market. Some good sales have been made, and negotiations are pending now for some round lots. Several of the Southern furnaces are figuring on these orders, and it is believed they were taken at prices considerably under the market, which has had a demoralizing effect to some extent, and buyers anticipate a further decline. On the other hand, some of the leading furnaces have withdrawn from the market, as they were well sold for the next few months and did not care to book at present prices. We cannot prophecy what the next 30 days will develop, though it seems that sellers are more sanguine than they were 10 days ago. Southern furnaces generally are sold well ahead on mill grades. Ohio Softeners are in better request. A reduction of 45¢ per ton in freight rates on Pig Iron from the South to this and Missouri River points went into effect on the 15th inst. Prices:

<i>Charcoal Foundry.</i>		
Missouri.....	\$20.00 @	\$21.00
Southern.....	20.00 @	21.50
<i>Coal and Coke Irons.</i>		
Southern.....	19.00 @	19.50
Ohio Softeners.....	21.00 @	23.00
<i>Mill Iron.</i>		
Southern.....	17.00 @	18.00
<i>Car-Wheel and Malleable Irons.</i>		
Southern.....	21.00 @	24.00
Lake Superior.....	22.50 @	23.50
Connellsville Coke at East St. Louis.....		5.85
<i>Old Rails and Wheels.</i>		
Old Rails.....	22.00 @	22.50
Old Wheels.....	20.00 @	20.50

Cleveland.

CLEVELAND, January 16, 1888.

Iron Ore.—Indications are not wanting of a break in lake freights. This will precipitate an active buying movement and the furnacemen and mine owners will not remain long apart. From 2,000,000 to 2,500,000 tons of Ore would be sold before February 1st if vessels rates should drop 20%. Ore dealers assert that certain vessel owners are ready to compromise and furnish options upon which sales can be based. The policy of the Ore dealers and mine owners is to refuse to listen to any negotiations from the vesselmen until reasonable transportation rates are proposed. The Ashland rate should not be above \$1.60 per ton, with \$1.25 to \$1.30 from Marquette and 90¢ from Escanaba. After advertising to the Ore dealers the statement that \$1.40 has been offered from Escanaba the vesselmen are now asserting that sales of Ore have actually been made on a basis of a \$2 rate from Ashland. Ore dealers deny this, and assert that not a ton of Ore will be sold until reasonable charters are obtained. The furnacemen are equally firm. They will not pay last season's prices for new Ore. Ten or twelve of the leading furnacemen in this vicinity say very positively that no money can be made in the manufacture of Pig Iron unless there is a drop of from 15% to 20% in prices. Some Ore has been sold during the past week—perhaps 11,000 tons—principally non-Bessemer Hematites, already on the docks, at Lake Erie ports. The Ore sold for \$5.10, f.o.b. cars at the dock.

Pig Iron.—The furnacemen seem to have the best of the situation. Inquiries are so numerous and for such substantial amounts that there seems every reason

for anticipating a market for an immense amount of Iron during the next four or five months. Sales aggregating 5500 tons have occurred during the week. Of this amount 1500 tons were of Scotch Foundry, to be delivered in three lots, the last delivery to be made in July. About 600 tons of No. 1 Foundry Iron sold for \$21.85.

Manufactured Iron.—The demand is said to be improving, although Bars are still quoted upon a basis of 1.75¢ @ 1.85¢, 60 days, 2% off for cash.

Old Rails.—The market is so dull that quotations are of but little value. Not over \$23 can be obtained for Tees. Old Wheels are asked for more freely, \$20.50 @ \$21 being paid.

Sheet Iron.—Stove manufacturers seem fully supplied, and the season is evidently over. Scattering sales are made on a basis of 2.75¢ for No. 24.

Nails.—As a result of local competition Iron Nails have declined to \$1.95, and Steel Wire Nails to \$2.80 per keg. This does not indicate any real weakness in the market.

Detroit.

CHARLES HIMROD & Co., dealers in Iron, Detroit, Mich., report, under date of January 16, 1888, as follows: The market during the past week has developed additional strength, owing to the large buying and large inquiries still to be supplied. This buying has come a little earlier than was expected, and is also larger in amount than had been generally anticipated, and with the comparatively short stocks in the hands of makers it would seem as if some slight advances, and perhaps a little further than slight advances, might occur in the very near future. This is applicable to nearly all grades of Iron, but particularly may it be said of Lake Superior Charcoal, which has received its support from the large number of car orders which have been placed, compelling manufacturers to buy Lake Superior Charcoal for their work. With about 20,000 tons only of Lake Superior unsold and with this strong demand it certainly seems a very favorable condition of affairs in the Charcoal Iron Market to-day. We quote the market as follows:

Lake Superior Charcoal, all numbers.....	\$22.00 @	\$23.00
Lake Superior Coke, All Ore.....	22.00 @	22.50
Lake Superior Coke, Cunder Mixed.....	19.75 @	20.50
Standard Ohio Blackband.....	22.00 @	22.50
Southern No. 2.....	19.50 @	20.50
Southern Silvery.....	19.50 @	20.25
Jackson County, Ohio, Silvery.....	21.50 @	22.50
American Old Iron Rails.....	25.00 @	26.00
Old Wheels.....	21.00 @	22.00

Coal Market.

The Anthracite Coal situation is changed in no essential particular. No apparent progress has been made in settling the miners' strike. The latest sign is an intimation that within a few days President Corbin will issue a statement of the business of the Reading Company covering several years, in which he will show that the company cannot afford as a matter of business to pay the miners the wages they ask. The statement will be an elaborate one, and it will be prepared with an idea of convincing the public and all other persons who are disposed to look at the matter from a business point of view that too much of the cash received for Coal goes to the workmen. This would indicate that the Reading officials will insist upon the acceptance of the \$2.50 basis of wages in effect prior to the September agreement. In Philadelphia the prevailing opinion is that the struggle will be protracted, and ex-President Gowen is quoted as saying he believed the miners would not resume work for two or three months. There is much pressure from

business men in Reading and Pottsville to induce Mr. Corbin to negotiate for a settlement, but without effect. Meanwhile the Wyoming collieries are being worked to their utmost capacity, and the men are represented as having control, satisfied with steady work and feeling that they can best aid their brethren on strike by remaining as they are. Many of the 38 furnaces on the Reading Railroad are kept in motion by the use of coke, of which large quantities are obtained from Harrisburg by the Pennsylvania Railroad.

The total production of Anthracite Coal for the week ending January 14th was 655,358 tons, of which 563,849 was from the Wyoming region, 50,000 from the Schuylkill and 41,507 from the Lehigh region. The total since January 1 is 1,165,369, as compared with 1,063,070 for the corresponding period last year, showing that the losses this year from the strikes are more than made good by the excessive productiveness of the Wyoming Valley, which last year turned out only 291,222 tons for the week corresponding with that just closed.

A report which may have much significance comes from Philadelphia that a project is on foot for leasing the Reading collieries to a powerful syndicate, by which means the business of Coal mining would become separated from the railroad business proper, and harmonious relations might be more easily preserved.

The retail Coal dealers in this city advanced prices about 25¢ per ton.

Bituminous Coal is active at full prices, and supplies are quickly taken. The shipments from the mines of the Cumberland region for the week were 62,039 tons.

A call has been issued for the third annual convention of the Coal miners and the operators of the United States, to be held in Pittsburgh on the 7th prox. It is represented that the wages will remain as now, unless prices and trade fall off, when a reduction will be insisted upon after November first.

Prices of Free Burning Anthracite are as follows, f.o.b., all sales governed by prices at time of shipment: Broken, \$4.15 @ \$4.25; Egg, \$4.40; Stove and Chestnut, \$4.25; Pea, \$3.25. An advance before the end of the week is possible.

Metal Market.

Copper.—The week under review opened in the London market at £83. 7/6 for Chili Bars, with sales of 625 tons. A cable message from London asserted that the syndicate had made a three-year contract for the product of the Rio Tinto mines and had closed similar contracts with Mason and Barry and the Arizona Copper Company, having besides secured all the Anaconda's Matte for the current year. This story did not prevent our market from continuing in its downward course, sales reaching 700,000 lb, at 16.50¢ for spot, 16.50¢ for January, 16.50¢ to 16.60¢ for February and 16.60¢ to 16.70¢ for March. On Friday London came £2. 15/ lower, being cabled £80. 12/6, with 875 tons sold. We followed suit on this side with a decline of 1/4¢, sales amounting to 600,000 lb, from 16.40¢ down to 16.20¢ for February, and at 16.45¢ @ 16.50¢ for March. A report was received from the Calumet and Hecla mines to the effect that a considerable force of men is watching the shafts so as to guard against another cave in, and that steam is still sent down one of the Calumet shafts. Work is progressing steadily at the South Hecla part of the mine, and it is stated that the January product will be considerably larger than the December. The official product for 1887 was 28,569 tons 961 lb, against 32,214

tons 830 pounds in 1886. A gentleman just arrived from the mine states that work may be resumed there on February 1 next, and that on March 1 three of the new stamp will be in operation. An effort is to be made at an early day to send a person into the mine equipped with one of the life-saving suits used in English collieries. Saturday not bringing any fresh cable news from Europe our market developed no new features, but went on drooping, 400,000 lb selling at 16.15¢ for February, and at 16.30¢ @ 16.35¢ for April. It appears that Copper shares were not affected last week by the decline in the metal, but that Rio Tinto, on the contrary, rose 15 francs. On Monday London opened at £75. 12/6, being £5 lower, with sales of 1125 tons. Our own market gave way a trifle further, 350,000 lb changing hands, at 15.95¢ for spot, 15.95¢ @ 16¢ for February, 16¢ @ 16.10¢ for March, and 16.10¢ for April. A message was received from Boston to the effect that the Lake Superior Copper mines are shipping by rail at the rate of about 50 carloads of Copper per week. Each car carries 20 barrels of 1250 lb \bar{p} barrel. One day lately South Hecla, part of the Calumet and Hecla mine, produced 500 tons of Stamp rock, showing great activity and promising nearly 2000 tons of mineral for the January product. London cabled an advance of 7/6 yesterday, the quotation being £76 and the sales reaching 700 tons. Here the market remained quiet and easy, sales not exceeding 150,000 lb, at 15.95¢ for January and 16.20¢ for March. The export of Pyrites from Spain during the first 10 months of 1887 was 650,535 tons, against 574,285 in 1886, and 689,143 in 1885; of Precipitate, 23,825 tons, against 23,378 and 22,881. The export of Ingot Copper from the United States during the first 11 months of 1887 was 11,514,453 lb, against 17,427,798 in 1886. The import into Liverpool and Swansea of American Copper in 1887 was 16,437 tons Fine, against 13,027 in 1886, 24,037 in 1885, 17,309 in 1884, 9410 in 1883, and 745 tons in 1882. This morning London is lower again by 15/ with Chili Bars, cabling the same £75. 5/; the decline is said to be due to bear manipulations on the part of the syndicate, the latter trying to buy some more on the other side. Of sales made by the same we do not hear, and it will load itself down to such an extent that the final crash is not unlikely to be as unprecedented as the advance has been between October 1, 1887, and December 31 of the same year. Best Selected gave way from £87 to £80 during the week. The spot quotation of Lake Copper at noon to-day was 16¢; 25,000 lb, February, brought 15.90¢, and 100,000 lbs., ditto, 15.85¢. Outside brands are irregular. There is a good deal of talk of export sales of Lake. We understand that the Calumet and Hecla will ship 300 tons in February and a like amount in March. The company has quite a considerable stock of Copper here.

Tin.—There has been a decline of 10/ in Spot Tin in the London market since our last report, and of £1 in futures, the quotation this morning being £166. 10/ spot, and £144 three months. Our own market has been inactive, featureless, yet firm, at 37¢, spot, 36 1/2¢, January, and 34.05¢ @ 34.10¢, April. During the first half of the current month, the Straights shipped to the United States 150 tons of Tin, against 200 in 1887, and to England, 1400, against 600. Their export to this country the first 11 months was 69,570 piculs, against 66,873 in 1886, 37,058 in 1885, 55,279 in 1884, 106,231 in 1883 and 104,395 in 1882. The import of Tin into the United States during the first 11 months of 1887 was 28,122,347 lb, against 26,248,414 in 1886. The market closes firm at 37¢, spot, 10 tons April bringing 33.85¢, 10 tons February

33.85¢ and 10 tons March, 34.15¢. **Tin Plates.**—There have been rumors that a syndicate had been formed among makers in Wales for the control of the article. Such has been the purpose, and a committee was appointed to lay out a plan for common action, but up to this writing nothing positive is known as to the final determination of manufacturers out there. Our own market has been moderately active and steady, closing firm at following quotations, per box, large lines: Siemens-Martin Steel, Charcoal finish, \$5.25 @ \$5.37 1/2; ditto Coke finish, \$5; Terns, \$4.50 @ \$4.75; and Coke, \$4.85 @ \$4.90. The import of Tin Plates into the United States during the first 11 months of 1887 was 593,908,521 lb, against 536,223,561 in 1886. Liverpool is coming 3d better on Cokes, which have recovered to 15/3.

Lead.—This metal has again been in a miserable plight during the week, only 200 tons Common Domestic changing hands, part at 4 1/2¢, but the remainder at 4 1/4¢, with absolutely no demand from consumers. London is lower likewise, Soft Spanish giving way from £15 to £14. 10/, and English Pig from £15. 5/ to £14. 15/. Spanish exportation of Pig Lead during the first 10 months of 1887 was 111,357 tons, against 94,097 in 1886 and 97,981 in 1885. Lead Pipe, 7 1/2¢; Sheet Lead, 8 1/2¢; Tin lined Lead Pipe, 15¢; Block-Tin Pipe, 15¢; Drop Shot, \bar{p} 25 lb bag, \$1.40; do., 5 lb bag, 35¢; Buck and Chilled, \bar{p} 25 lb bag, \$1.75; and do., 5 lb, 40¢.

Spelter and Zinc.—A moderate demand has been noticeable at 5 1/2¢ @ 5 3/4¢ for Common Domestic, as to brand. The quotation of Silesian in the London market has remained unaltered, £21, and in our own market Silesian would not bring to-day over 6.30¢. Sheet Zinc is wanted at 6 1/4¢ @ 7¢, Domestic. Spanish exportation of Calamine during the first 10 months of 1887 was 21,473 tons, against 22,497 in 1886 and 31,400 in 1885.

Antimony.—Has been dealt in to a limited extent only at 15¢ Cookson and 11 1/2¢ Hallett, the latter not varying from £50 in London.

New York Metal Exchange.

The following sales are reported:

THURSDAY, January 12.	
25,000 lb Copper, February.....	16.50¢
175 lb Copper, February.....	16.55¢
25,000 lb Copper, February.....	16.60¢
50,000 lb Copper, February.....	16.55¢
100,000 lb Copper, spot.....	16.50¢
25,000 lb Copper, March.....	16.70¢
25,000 lb Copper, April.....	16.80¢
25,000 lb Copper, April.....	16.85¢
16 tons Spelter, January.....	5.25¢
25,000 lb Copper, February.....	16.60¢
50,000 lb Copper, January.....	16.5¢
32 tons Lead, January.....	4.85¢
75,000 lb Copper, February.....	16.45¢
10,000 lb Copper, March.....	16.60¢
FRIDAY, January 13.	
10 tons Tin, January.....	38.75¢
25,000 lb Copper, February.....	16.40¢
50,000 lb Copper, March.....	16.50¢
25,000 lb Copper, March.....	16.45¢
100,000 lb Copper, February.....	16.4¢
25,000 lb Copper, February.....	16.30¢
25,000 lb Copper, February.....	16.25¢
50,000 lb Copper, February.....	16.30¢
300,000 lb Copper, February.....	16.25¢
SATURDAY, January 14.	
125,000 lb Copper, February.....	16.15¢
10,000 lb Copper, April.....	16.35¢
25,000 lb Copper, April.....	16.30¢
75,000 lb Copper, April.....	16.35¢
50,000 lb Copper, April.....	16.3¢
25,000 lb Copper, April.....	16.35¢
MONDAY, January 16.	
10 tons Tin, April.....	34.00¢
75,000 lb Copper, February.....	16.00¢
25,000 lb Copper, February.....	15.95¢
25,000 lb Copper, March.....	16.05¢
50,000 lb Copper, March.....	16.00¢
25,000 lb Copper, April.....	16.10¢
50,000 lb Copper, February.....	15.95¢
25,000 lb Copper, spot.....	15.95¢
50,000 lb Copper, March.....	16.10¢
TUESDAY, January 17.	
100,000 lb Copper, March.....	16.20¢
50,000 lb Copper, January.....	15.95¢
WEDNESDAY, January 18.	
10 tons Tin, April.....	33.85¢
10 tons Tin, February.....	35.85¢
10 tons Tin, March.....	34.15¢
10 tons Tin, April.....	33.45¢
25,000 lb Lake Copper, February.....	15.90¢

100,000 lb Lake Copper, February.....	15.85¢
25,000 lb Lake Copper, June.....	15.85¢
25,000 lb Lake Copper, June.....	15.90¢
150,000 lb Lake Copper, February.....	15.95¢
225,000 lb Lake Copper, February.....	15.90¢
25,000 lb Lake Copper, April.....	16.15¢
50,000 lb Lake Copper, June.....	15.45¢
50 tons Lead, January.....	4.65¢
162,500 lb Spelter, February.....	5.25¢

Paints, Oils, &c.

Paints.

Black, Lamp—Coach Painters'.....	\bar{p} 22 @ 24¢
Ordinary.....	6¢
Black, Ivory Drop, fair.....	12 @ 15¢
best.....	23¢
Black Paint, in oil.....	kegs, 8¢; assorted cans, 11¢
Blue, Prussian, fair to best.....	40 @ 55¢
in oil.....	45 @ 55¢
Chinese dry.....	70¢
Ultramarine.....	18 @ 30¢
Brown, Spanish.....	14¢
Van Dyke.....	10 @ 12¢
Dryers, Patent American.....	ass'd cans, 9¢; kegs, 7¢
Green, Chrome.....	15 @ 23¢
Green, Chrome in oil.....	14 @ 18 @ 25¢
Green, Paris.....	good, 20¢; best, 25¢
Green, Paris in oil.....	good, 20¢; best, 25¢
Iron Paint, Bright Red.....	\bar{p} 10 24¢
Iron Paint, Brown.....	\bar{p} 10 11¢
Iron Paint, Purple.....	\bar{p} 10 3¢
Iron Paint, Ground in oil, Bright Red.....	\bar{p} 10 61¢
Iron Paint, Ground in oil, Red.....	\bar{p} 10 51¢
Iron Paint, Ground in oil, Brown.....	\bar{p} 10 51¢
Iron Paint, Ground, Purple.....	\bar{p} 10 6¢
Litharge.....	61¢
Mineral Paints.....	2 @ 4¢
Orange Mineral.....	10¢
Red Lead, American.....	61¢
Red Venetian (Eng.) dry.....	\$1.65 @ \$1.70
Red Venetian in oil.....	as t'd cans, 11¢; kegs, 8¢
Red Indian Dry.....	9 @ 12¢
Rose Pink.....	10 @ 13¢
Sienna, American Raw, powdered.....	4¢
Sienna, Burnt, powdered.....	41¢
Sienna, Burnt, in oil.....	10 @ 16 @ 20¢
Sienna, Raw.....	11 @ 15 @ 25¢
Umber, Burnt, powdered.....	4 @ 8¢
Umber, Burnt, in oil.....	9 @ 12 @ 15¢
Umber, Raw, powdered.....	4 @ 7 1/2¢
Umber, Raw, in oil.....	9 @ 12 @ 15¢
Vermilion, Chinese.....	90¢
Vermilion, English.....	70 @ 71¢
Vermilion, American Common.....	15¢
White Lead, American pure dry.....	6¢
White Lead, American pure dry, in oil.....	7 @ 7 1/2¢
White Paris, English Prime.....	2 @ 2 1/2¢
Yellow Ocher, French.....	\$1.75
Yellow Ocher, French, in oil.....	ass't'd cans, 11¢; kegs, 8¢
Yellow Ocher, Vermont.....	in casks, 1 1/2¢
Yellow Chrome.....	17 @ 27¢
Yellow Chrome, in oil.....	14 @ 18 @ 25¢
Zinc White, American No. 1, dry.....	5 @ 6¢
Zinc White, American No. 1, in oil.....	9¢
Zinc White, French (Paris Dry).....	6 1/2¢ @ 7 1/2¢
Zinc White, French, in oil.....	10 @ 11¢

Oils.

Bleached Whale, \bar{p} gal.....	41 @ 44¢
Bleached Sperm, \bar{p} gal.....	65 @ 71¢
Fish Oil, Pressed.....	26 @ 28 1/2¢
Lard, Prime Winter.....	63 @ 64¢
Cylinder Oil.....	70¢
Machinery.....	45¢
Engine.....	55¢
Linseed, Raw, in casks and bbls.....	55¢
Linseed, Boiled, in casks and bbls.....	58 @ 59¢
Neatsfoot.....	45 @ 65¢
Cotton Seed, Refined.....	41 @ 44¢

Sundries.

Asphaltum, Cuban, \bar{p} lb.....	5 1/2¢ @ 6 1/2¢
Asphaltum, Egyptian.....	5 @ 9 1/2¢
Benzine, 62°, \bar{p} gal.....	3 1/2¢ @ 4 1/2¢
Coal Tar.....	\bar{p} bbl, \$3.00 and \$4.00
Chalk, \bar{p} 100 lb.....	45¢
Chalk, Block.....	36¢
Crucibles No 14 and upward, \bar{p} number.....	31¢
Grain Emery, 300 lb kegs.....	4 @ 14¢
Flour Emery, 25 lb kegs.....	2 1/2¢ @ 2 3/4¢
Glue, White, finest quality.....	18 @ 35¢
Glue, Sheet.....	13 @ 20¢
Glaziers' Points, Zinc, \bar{p} box.....	\$4.75
Gum, Copal.....	30¢
Gum, Damar.....	25¢
Gum, Shellac, English.....	30¢
Gum, Shellac, English, dark.....	25¢
Mineral Wool, ordinary, \bar{p} lb.....	1 @ 1 1/2¢
Mineral Wool, extra.....	3 @ 3 1/2¢
Naphtha, 70°.....	9 @ 11¢
Naphtha, 78°.....	9 1/2¢ @ 10 1/2¢
Pumice Stone, selected lumps.....	3 @ 6¢
Pumice Stone, powdered.....	2 @ 2 1/2¢
Pine Tar, bbls.....	\$2.10 @ \$2.12 1/2
Pitch.....	\$1.40
Plumbago, E. I. Po., \bar{p} lb.....	1 @ 6¢
Plumbago, American, \bar{p} lb.....	6 @ 10¢
Plumbago, Gun Powder Glazing, \bar{p} lb.....	1¢
Plumbago, Shot Polish, \bar{p} lb.....	10¢
Putty, in bladders.....	2 1/2¢
Putty, in bulk.....	1 1/2¢ @ 2¢
Rosin, Strained and Good.....	\$1.32 1/2 @ \$1.47 1/2
Rosin, E. & F.....	\$1.45 @ \$1.50
Rosin, G. & H.....	\$1.57 1/2 @ \$1.65
Rosin, I & K.....	\$1.75 @ \$1.85
Rosin, M. & N.....	\$2.00 @ \$2.30
Spirits Turpentine, \bar{p} bbl.....	41 @ 44¢
Stove Polish, Dixon's.....	\bar{p} gross, \$6.00
Stove Polish, Rising Sun.....	5.50
Stove Polish, Gem.....	4.50
Stove Polish, Jet Black.....	3.50
Waste, No. 1 Cop.....	8 1/2¢
Waste, No. 1 White Machine.....	8 1/2¢
Waste, No. 2 White Machine.....	8 1/2¢
Waste, No. 1 Colored.....	6 1/2¢
Waste, No. 2 Colored.....	5 1/2¢
Waste, Washed Machine.....	8 1/2¢
Whiting, Spanish, \bar{p} 100 lb.....	50¢

IMPORTS.

The imports of Iron and steel, Hardware, &c., at this port from January 9 to January 14, inclusive, were as follows:

Iron and Steel.

	Jan. 9 to Jan. 14, inc.	Jan. 1 to Jan. 14, inc.
Pig Iron: N. S. Bartlett..	300	700
Dana & Co.....	250	300
Jas. Williamson & Co.....	200	700
Sanderson & Son.....	2	...
Steel: W. F. Wagner.....	20	57
J. Abbott & Co.....	23	233
Temple & S.....	12	...
Newton & S.....	9	13
R. F. Downing & Co.....	7	13
C. Hugill.....	5	24
Cary & Moen.....	5	21
Steel Rods: J. A. Roeb- ling's Sons.....	130	...
Cary & Moen.....	42	130
R. H. Wolff & Co.....	16	494
Iron: G. Lundberg.....	26	351
Bacon & Co.....	23	...
Iron Rods: Naylor & Co.....	50	150
Steel Sheets: Lalan & G. Mfg. Co.....	33	84
A. R. Whitney & Co.....	28	321
Cary & Moen.....	12	...
Henderson Bros.....	4	...
Steel Hoops: A. R. Whit- ney & Co.....	216	233
Steel Tubes: Funch, E. & Co.....	14	...
J. S. Leng.....	10	...
Steel Casings: R. F. Downing & Co.....	2	...
Steel Ingots: C. Van Philip Sheet Iron: T. B. Cod- dington & Co.....	50	129
A. A. Thompson & Co.....	21	...
Rivet Rods: G. Lundberg.....	10	130
Iron Pipes: W. H. Wal- lace & Co.....	8	...
Boiler Tubes: W. H. Wal- lace & Co.....	7	...
Type Metal: Jas Frazer..	100	170

Tin Plates.

	Boxes.	Boxes.
Phelps, Dodge & Co.....	14,402	27,398
A. A. Thomsen & Co.....	7,536	16,409
Dickerson, Van Dusen & Co.....	4,898	31,294
T. B. Coddington & Co.....	4,074	18,256
Naylor & Co.....	3,820	2,709
Bruce & Cook.....	2,301	7,848
Jas. Byrne & Son.....	1,600	...
G. B. Morewood & Co.....	1,000	2,600
N. L. Cort & Co.....	886	7,549
Hy, Whittemore.....	873	1,478
Pratt Mfg. Co.....	856	3,478
C. S. Mersick & Co.....	216	416
Merchant & Co.....	100	713
R. Crooks & Co.....	55	3,382
F. Wright & Sons.....	32	...

Metals.

	Pounds.	Pounds.
Tin: J. Abbott & Co.....	1,071,717	...
Crooke & S. & Rfng. Co.....	22,428	44,828
Hendricks Bros.....	14,390	...
D. Thomsen & Son.....	14,330	36,707
Nickel: McCoy & Sanders.....	5,000	10,000
Spelter: Frindersville Zinc Co.....	44,092	50,706
American Metal Co.....	55,115	...
Antimony: Edw. Hill, Son & Co.....	200	...
Dickerson, Van Dusen & Co.....	34	...
Phelps, Dodge & Co.....	20	70

Irons and Metals Warehoused from January 9 to
January 14, inclusive:

	Tons.
Steel Rods: R. H. Wolff & Co.....	220
Iron: J. Abbott & Co.....	13
Old Iron Rails: Brown Bros & Co.....	668
Old Fish Plates: Brown Bros. & Co.....	20

Hardware, Machinery, &c.

Adams, R. & H., Mach'y, bxs., 2
Barbour Bros. & Co., Mach'y case 1
Bloomfield, J. C. & Co., Mach'y, pkgs. and pcs., 61
Castle, G. & Co., Hdw., cs., 10; mach'y cs., 60
Degraw, Aymar & Co., cables, pcs. and pgs., 10
Folsom, H. & D., Arms, cs., 5
Junge, F. W. & Co., Mdse., cs., 5
Schoverling, Daily & Gales, guns cs., 14
Wiebusch & Hilger, Mdse., cs., 6
Wilkes, Carrie Mfg. Company, Mach'y, pgs., 42
Witte, John G. & Bro., Cutlery cs., 7

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira.....	19.3
Florin (Netherlands).....	40.2
Florin (Austria).....	35.9
Milreis (Portugal).....	41.08
Milreis (Brazil).....	54.6
Mark (Germany).....	23.8
Kilogram.....	220.5
Picul.....	134.

BRAZIL.

PARA, January 10, 1888.—*India Rubber*.—Further purchases have been made for New York of 250 tons, making in all about 800,000 lb taken so far this month at an equivalent of 77¢, cash, laid down in New York, one-half

having been bought for account of a foreign speculative buyer. This leaves the Para market quite sensitive, as large receipts are not likely beyond this month.—*Per cable direct*.

WEST INDIES.

PORT OF SPAIN, TRINIDAD, December 9, 1887.—*Asphaltum*.—Our market has been moderately active and steady at an advance to \$13.25 for Boiled, and \$5.50 for Crude. Since January 1 there have been shipped 64,479 tons, against 94,476 in 1886, and 79,698 in 1885. *Exchange* on London, 90 days' sight, \$4.60 @ \$4.80.—*E. P. Masson*.

EAST INDIES.

SINGAPORE, November 29, 1887.—*Tin*.—Our market has continued excited, and a further notable advance has taken place. Some 235 tons were taken for export at \$49.75 @ \$52.50, with sellers at the close at \$53.50. Total shipments to England since January 1, 101,297 piculs; to the Continent, 23,425, and to the United States, 54,423. Of *Gum Copal*, 50 tons were placed at \$6.50 @ \$11.37½ @ picul, as to quality. *Gutta Percha* has been fully sustained, the demand being good and arrivals light. *India Rubber* has been paid \$48 @ \$74, as to quality. *Borneo Gum* is wanted and firm, small lots bringing \$43.65 @ \$50 @ picul. *Exchange*, four months' bank, 3/2½.—*Gillfillan, Wood & Co*.

GERMANY.

HAMBURG, January 7, 1888.—*Iron*.—The Rhenish-Westphalian market has remained firm; the various syndicates go on raising their prices both of Pig and Finished. Thus Pig has been raised 2 marks @ ton Forge, 1 mark Thomas, 1 mark Foundry and 3.50 Bessemer. In November Pig Iron production was 343,081 tons, against 274,057 in November, 1886, the total for the first 11 months being for all Germany 3,547,497 tons, against 3,654,436 during the corresponding period of 1886. Finished Iron has been well sustained; the syndicate's production since August 1 has been placed without the least difficulty, hence there are no misgivings as to the facility of selling whatever the rolling mills may be able to turn out. Prices have been fixed as follows: 122.50 marks for Western Germany, 125 for Central, 132.50 for Northern, and 118 for Southern. In Upper Silesia the absorption of Pig Iron has been going on at such a rate in 1887 that a portion of the contracts for forward delivery had to be transferred into the first quarter of the new year. The fact is that the consumption of Forge, Thomas and Foundry has been so large that the cessation of a large export to Poland has not been felt. Nor is there the least uneasiness about the future. The Wire branch is doing well in Germany generally. Steel works have latterly had a good run of orders for supplying domestic requirements, while foreign commands continue flagging. Railroad Material has so far failed to improve, except Rolling Stock, for which good orders have been received and additional ones are looked for. Car-Wheels, Axles and Hoops have remained well sustained. Machine shops, Foundries and Steam Boiler markets are all satisfactorily engaged; this may also be said of Structural Iron works. *Metals*.—After a month of great irregularity in quotations prices, with a restricted demand, adjust themselves to the high London ruling.—*Borsenhalle*.

BELGIUM.

BRUSSELS, January 7, 1888.—*Iron*.—The year opens under favorable circumstances, and makers generally feel encouraged by the results obtained in 1887. All Belgian works are fully booked, while frequently fresh orders are dropping in. Although it has not been an easy matter so far to raise the price of Finished, the syndicate resolved to advance Merchant half a franc @ ton, and it is hoped that consumers will submit to it without difficulty. Meanwhile Pig continues so scarce that none remains available for the first quarter of the year. On the 1st of next month the National Branch Railroad Company will be in the market through adjudication for 167 passenger and 326 freight Cars. *Coke* has become very scarce and commands 12.50 @ 13 francs @ ton.—*Moniteur Industriel*.

FRANCE.

PARIS, January 7, 1888.—*Metals*.—Have been inactive and unaltered. *Iron*.—The dealers in this city have at length agreed to fix the price at 13.50 francs @ 100 kg., Merchant, and 12.50 Beams. At St. Dizier a steady good demand is noticeable for Merchant Iron and Wire. Most of makers are in receipt of satisfactory orders to commence the new year with; this relates to Foundries likewise, work enough having been secured for the entire winter time. Foundry Pig, nevertheless, improves but slowly in the district. Ordinary No. 2 Coke Merchant is willingly paid 13 @ 13.50 francs @ 100 kg. Iron Wire is rising; this and the advance in Merchant is expected to benefit other articles dependent on them. At Valenciennes the com-

mon price for Finished has been fixed at 12.50 @ 13 francs, as to quantity needed.—*Moniteur des Interets Materiels*.

AUSTRIA.

VIENNA, January 4, 1888.—*Iron*.—Business in the Austro-Hungarian Iron trade is slowly casting off the holiday spell of dullness, and it is to be hoped that we may be on the eve of a genuine active revival, now that the syndicate compact has been renewed, and consumers have no further reason to hold back orders. Prices have remained steady at ensuing quotations in florins @ ton: Pig Iron, 38 @ 47; Merchant, 110 @ 120; Sheets, 105 @ 170, and Beams, 117.50 @ 127.50. *Metals*.—It has been slow work to induce consumers to replenish stocks at least to a moderate extent at a parity with quotations ruling in Northwestern Europe, and we now quote Copper 100 florins; Lead, 23; Spelter, 24; Tin, 219 @ 220; Antimony, 46, and Quicksilver, 256.—*Handels-Journal*.

ECUADOR.

GUYAQUIL, December 5, 1887.—*Ivory Nuts*.—Receipts continue heavy and large shipments are being made per steamer. More sailing vessels have been chartered. We quote @ 50 kg. 12/6 @ 13/, cost, freight and insurance.—*O. Wolfram & Co*.

The Pennsylvania Company will issue a new special freight tariff to Southern points which will take effect on the 23d inst. It will be from Pittsburgh and Allegheny and include all points between those cities as far West as Steubenville, on the Panhandle road and Beaver Falls, on the Fort Wayne. The new rates are a slight advance over those in use at present. The rates on iron and steel products are as follows:—To Baton Rouge, La., carloads, 33 cents; less than carloads, 42½ per 100 pounds; New Orleans, 33 and 42½; Memphis, Tenn., 27 and 37½; Greenville, Huntington, Natchez and Vicksburg, Miss., 33 and 42½; Lexington and Paducah, Ky., 25 and 32½; Mobile, Ala., 35 and 44½.

The shipments of coke from the Connellsville region last month aggregated 25,500 cars, as against 24,000 in November, an average of 968 cars per day. Of these 7550 cars were marketed by the J. M. Schoonmaker Coke Company, Connellsville Coke and Iron Company and McClure & Co. The remainder was marketed by the H. C. Frick Coke Company and the other operators. The destinations were as follows: West of Pittsburgh, 15,100 cars; east of Connellsville and Greensburg, 4900; Pittsburgh and rivers, 5200. Compared with shipments of the month previous there was an increase west of 500 cars and east of 600. The Pittsburgh shipments remained about the same. At present McClure & Co., the J. M. Schoonmaker Coke Company and the Connellsville Coke and Iron Company are unable to handle all their own coke and that of the producers' association, hence the lack of destinations at some of the smaller works. J. W. Moore & Co. are handling some of the producers' association coke. A large number of the works in the region are suspending operations two days in the week and are loading up their stock coke. For the first time in some months the car supply is more than equal to the demand. This is not expected to continue long, however, as a number of idle furnaces are preparing to resume operations, which is expected to cause a considerable increase in the demand for coke.

Dienbeldt & Eisenhardt, of Philadelphia, have just completed their new foundry, which is probably one of the most complete of its kind in the country. The arrangements for light, heat, ventilation, &c., have been studied out thoroughly, with a result that is highly satisfactory. Many of the appliances have been developed by the proprietors personally, that in the matter of ventilation being specially ingenious. There are 60 windows arranged so as to catch the air from any quarter, any ten of which can be opened or set at any angle by the slightest touch of the hand.

General Hardware.

The volume of business continues moderate, with little change in current prices. Inquiries are, however, coming in freely in regard to goods required for the Spring trade, and the indications are regarded as pointing to a satisfactory business.

NAILS.

There are some indications of a slightly better feeling, which has manifested itself in two directions. An idea seems to be gaining ground among buyers that since Nails have been unduly low for so long a time it is within the range of possibilities that a slight advance may be insisted upon at no distant day. On the other hand, sellers are not so prompt in accepting as correct representations that others are making concessions which they must necessarily meet. The contemplation of annual balance sheets may have caused some of the most eager sellers to pause. It is certain that a very heavy percentage of the Nails made east of the Allegheny Mountains in 1887 must have been produced at a direct loss. We quote for Iron Nails, in carload lots, on dock, \$1.90 @ \$2, while small lots from store bring \$2 @ \$2.10. At the meeting of the Atlantic States Nail Association last week the question of revising the schedule was again discussed.

WIRE NAILS.

The market continues without material change, with a fair amount of activity. A good many large lots are being purchased at the present low prices. Quotations are about the same as at our last writing, with perhaps a slight shading. The American Screw Company, Providence, R. I., quote the Nails in 20-keg lots at \$2.75, f. o. b. Providence.

MISCELLANEOUS PRICES.

The Capitol Mfg. Company, Chicago, Ill., issue a price list of the Acme Wrenches, the different patterns of which are illustrated with reference to the special features of the Wrenches, in which allusion is made to their simplicity, the fact that they are all steel and the strength that results from the manner of their construction. They also emphasize the point that their list is the same for Bright Wrenches that others charge for Black. Their list prices are as follows, their discounts being 60 per cent. on Bright, and 50 per cent. on Nickleled; terms, 90 days, or 3 per cent. additional for cash in 10 days:

Bright Standard Wrench.		All Nickleled Wrench.	
Size.	Per doz.	Size.	Per doz.
5 inch, Bicycle...	\$8.00	5 inch, Bicycle...	\$9.60
6 " " " " " "	9.00	6 " " " " " "	10.80
8 " " " " " "	10.00	8 " " " " " "	12.00
10 " " " " " "	12.00	10 " " " " " "	15.00
12 " " " " " "	14.00	12 " " " " " "	18.00
15 " " " " " "	24.00	15 " " " " " "	28.80
18 " " " " " "	30.00	18 " " " " " "	36.00
21 " " " " " "	36.00	21 " " " " " "	57.00

The Acme Combination Pipe, Bolt and Nut Wrench.		
Size.	Size of pipe.	Per doz.
10 inches.....	1/4 to 2 inches.....	\$24.00
12 inches.....	1/4 to 2 1/2 inches.....	30.00
15 inches.....	1/4 to 3 1/2 inches.....	36.00

The manufacturers of Reapers, Mowers and binders, comprising 22 establishments in all, held a meeting at the Grand Pacific Hotel, Chicago, on the 11th, 12th and 13th insts., for the purpose of forming a national association and adopting measures to curtail production, regulate prices and fix a uniform system of credits. The business has been suffering for some time from over-production, low prices and a faulty system of giving credit. Lewis Miller, of Akron, Ohio, was elected president of the association.

Abram Quackenbush, 313 and 315 West Thirty-seventh street, New York, announces the following revised prices of the Knobs of his manufacture, the terms being cash, 30 days, with an extra discount of 2 per cent. for spot cash, f. o. b.

New York, cases charged for. An additional 10 per cent. discount is given if taken in lots of 100 dozen:

	Per dozen.
No. O, Mineral Japanned Mountings.....	\$0.66
No. X, Porcelain Japanned Mountings.....	.76
No. 41, Porcelain, Porcelain Roses, Silver Mountings.....	2.11
No. 401, Porcelain, Porcelain Roses, Nickel Mountings.....	2.00
No. 201, Porcelain, Silver Roses and Mountings.....	1.95
No. 2001, Porcelain, Nickel Roses and Mountings.....	1.85
No. 451, Porcelain, Bronze Metal Roses and Mountings.....	2.00
No. 43, Porcelain, English Bronzed Roses.....	1.25
No. 39, Jet, Japanned Mountings.....	.80
No. 351, Jet, Bronze Metal Mountings.....	2.00
No. 353, Jet, English Bronzed Roses.....	1.25

The American Buckle and Cartridge Company, West Haven, Conn., for which the Alford & Berkele Company, 77 Chambers street, New York, are agents, announce a reduction in the price of their IXL Water Proof Paper Shot Shells, which are sold from the following list at a discount of 40 and 5 per cent., 60 days, or 2 per cent. off for cash in 10 days:

	Per 1000.
No. 10, 2 3/4 and 2 1/2 inches.....	\$9.00
No. 12, 2 3/4 inches.....	8.00
No. 16, all lengths.....	7.50

They state that they are still making this brand without cheapening it in any way, notwithstanding the heavy reduction in price. The Shells will hereafter be made up waterproof only (not plain), and the company will furnish them in either white or black paper, as desired. They also announce an entirely new Shell, which they are now making, and which is offered to the trade as reliable, and guaranteed for one shot, and sold at a price which is referred to as considerably lower than any trustworthy Shell which has yet been put on the market. This new Shell is designated as Special Quality not Waterproof, and it is furnished in either white or black paper. The list on this Shell is as follows, subject to a discount of 40 and 10 and 5 per cent., 60 days, or 2 per cent. off for cash in 10 days:

	Per 1000.
No. 10, 2 3/4 and 2 1/2 inches.....	\$9.00
No. 12, 2 3/4 inches.....	8.00

The manufacturers of Hand Bells have at length announced an advance in these goods, the discount on Light Brass Hand Bells being made 75 per cent., on the Heavy 65 per cent., and on the White Metal, 70 per cent.

There is no special change in Bright Wire Goods, which continue low and irregular.

At a meeting of the Association of Coffee Mill manufacturers the association price of the Side Mills was made the same as the Box Mills—namely, discount 50 and 10 and 2 per cent. for cash.

Escutcheon Pins have recently been advanced. A discount of 60 to 60 and 5 may be regarded as the manufacturers' quotation to the general trade.

The following are revised quotations on Spooled Wire, as made by Malin & Co., Cleveland, Ohio: Annealed Steel and Tinned, discount 50 per cent.; Brass and Copper, discount 45 per cent.

BARB WIRE.

In New York the Barb-Wire market is quiet, manufacturers quoting 3.90¢ for carload lots of Four-Point Galvanized Barb Wire.

A meeting is being held to-day at Chicago of nearly all the leading Barb-Wire manufacturers in the country to discuss the effect of the decision of Judge Shiros. Messrs. Washburn & Moen and J. L. Ellwood have under date of January 16th issued a circular referring to this decision in which they say:

As to the effect upon licensees: The license is a contract under which we grant the right to make and sell a specified quantity of certain styles of Barb Wire upon the payment of a certain royalty. The licensee is licensed to manufacture under all our patents both on

Barbs and machinery. The declaration of invalidity of any one patent in nowise affects the contract relation."

As to the effect of this decision upon the public, they say:

Judge Bewer, of the Eighth Judicial Court, comprising the States of Iowa, Minnesota, Nebraska, Missouri, Arkansas, Kansas and Colorado, has sustained the Glidden patent, and his decision is law, not only in the case of the Beat-em-all Company. If this decision is not set aside by Judge Shiros for good reasons which may hereafter be brought to his notice the case will be appealed to the Supreme Court. Meantime no responsible party can safely undertake to manufacture the Glidden Wire or sell an unlicensed product. We shall vigorously prosecute all infringers upon Glidden and other Barb patents and upon the machine patents, which fully cover the underlying principle involved in all Barb-Wire machinery. Our conclusions upon the three points raised are, therefore:

1. That the adverse decision of Judge Shiros is based upon a misapprehension of the true facts, as we believe we shall be able to show, and if his judgment is not set aside by him we are confident it will be reversed by the Supreme Court.

2. The contract relation between ourselves and our licensees is not affected by this decision.

3. This decision gives the public no additional rights to manufacture or sell unlicensed Barb Wire.

OBITUARY.

In a recent issue we referred to the death of Alexander F. Williams, of Sieg & Williams, Davenport, Iowa, and are now able to give to our readers the following sketch of his life, which is taken from an appreciative tribute from one of the papers of that city. His death occurred at Atlantic, Iowa, on the 15th ult., Mr. Williams at that time being on a business trip such as he was accustomed to make at the beginning of every month. In his death Davenport is referred to as losing one of its foremost citizens, one of its most energetic and pushing merchants, and one of its best men:

"Alexander F. Williams was born in Westfield, N. J., June 10th, 1826, son of Mr. and Mrs. Charles C. Williams. So he was six months past his 61st year. The family came to Davenport in 1843, and the father purchased a farm on the Locust street road, three miles west of the city. The son remained with his parents until 1846, when he went to New York city and entered the then famous wholesale dry goods house of Ely, Clapp & Bowen on Broadway. He was in that house as salesman for 12 years. He returned to Davenport in 1858, and entered into partnership with his brother-in-law, J. M. Eldridge, in the dry goods business—which was carried on by the firm on Brady street for three or four years. In 1862 the firm dissolved, and Mr. Williams entered the service of Sickels, Close & Co., wholesale Hardware, of this city, as traveling agent. He was with this house and that of William Blair & Co., Chicago, until 1869, when he and R. Sieg formed partnership in jobbing of Iron, Steel, Blacksmith Findings and wagon stuff. Their business was a success from the start—as their present immense store at Main and Third streets shows. It is the largest in its line in Iowa. The firm had just completed arrangements for a great extension of their business, to be opened up on the 1st of January.

"As a citizen he was valuable to the city's interest in every way—he was so ready with work and means to help any enterprise that enhanced the city's growth. He was president of the Board of Trade two years—1883 and 1884, and was a regular pusher in the position. Whenever the Board of Trade or Advance Club met to consider measures for securing a railroad, to accomplish something for the Hennepin Canal bill, to introduce new manufacturing enterprises, whatever was in hand, one of the sure expressions would be 'there is Alex. Williams; we can count on him.' It was the same thing in the cause of charity

or Christian advancement—"there's Alex. Williams; he'll take hold." He was genial and generous—but not generous in a foolish way. Yet he was outspoken; it was very easy to obtain his opinion on any subject he understood—and if he didn't understand it he would tell you so very quickly. He was firm in his convictions, yet liberal in his views and respected the opinions of others. The death of such a citizen is a public loss, and the whole city will feel it."

TRADE TOPICS.

We have the following communication from a well-known Hardware house in regard to the matter of inventorying goods in cases where the interest account is charged with the cash discount:

"We contend that the interest should be an expense, and take the inventory on the cash basis—that is, with the cash discount off. There is no use whatever in a concern deceiving themselves. Some concerns allow cash discounts to come in as a profit, while others contend that the stock should be taken with the discount off. This necessarily makes interest on borrowed money to run the business an expense."

An old builder suggests a change in the form of keepers or sockets for Door and Shutter Bolts. As now made they conform exactly to the size of the Bolt, allowing no play whatever in any direction. So far as the lateral motion of the door or window is concerned, no fault is to be found with a close fit, as a rigid hold is desired to prevent rattling. But he contends that the opening in the keeper or socket should be made at least $\frac{1}{4}$ inch wider than the Bolt, so as to allow for the unequal settling of the building or the varying shrinkage of the wood to which the two parts of the bolt are secured. It is a very frequent occurrence in a new house to find after a very short time that few of the Bolts will work. They were accurately adjusted when they were put in place, but, from one of the causes above noted, the Bolts and keepers are no longer in line with each other, and these fastenings are useless until screws are extracted and parts are reset, with a possibility that the operation may have to be repeated in a few weeks or months, when another settling or shrinkage has occurred. A little leeway up and down would obviate this trouble and relieve carpenters from the censure of housekeepers who think the ill-fitting Bolt comes from the employment of a botch mechanic. If the casing of a door has been cut to fit the keeper to its place, and it becomes necessary to move it slightly up or down, a fresh cut is necessary and the woodwork of that door is sadly injured in appearance. It may occur to our practical readers also that Locks frequently refuse to work from the same causes, and that it would be desirable to have improvements of the same kind made in them.

THE COVERT MFG. COMPANY,

West Troy, N. Y., have issued their January, 1888, catalogue and price list. It relates to the Covert Harness Snaps, Web and Rope Goods, Chain Goods, Chain, &c., and represents their latest additions to their line, most of which we have already described. It is accompanied by the following discount sheet:

Loop Harness Snaps	50
Round Eye Snaps	6 & 10
No. 34 Round Eye Snaps	60 & 10
New Loop Harness Snaps	50 & 5
New R. L. Harness Snaps	60
Martingale Loop Snaps	50
Snap and Thimble	60
New Snap and Thimble	60 & 10
Thumb's	60 & 10
Round Eye Swivel Snaps	60
Loop Swivel Snaps	60
Heavy 1-in. Swivel Snaps	60
Giant Open Eye Snaps	60
Open Eye Snap	50 & 10
New Open Eye Snaps	50
Double Snaps	50
Combined Bit and Snaps	35
Leather Horse Tie	35

Strap Eyes	50
Horse Ties, Snap and Thimble, Jute	60 & 10
Hemp	50
Cattle Ties, Snap and Thimble, Jute	60 & 10
Hemp	50
Horse Tie, New Snap and Thimble, Jute	60 & 20
Cattle Tie, New Snap and Thimble, Jute	60 & 20
Lariat Tether	50 & 10
Picket Pins	60
Horse Tie, O. K., Jute	60 & 20
Cattle Tie, O. K., Jute	60 & 20
Web Horse Tie	50
Rope Halter, 14 in., Jute	50
Hemp	40
7-16 in., Jute	60 & 10
Adjustable Rope Halters	35
Halter Leads, Hemp	50
Jute	60
New Snap	60 & 10
Gentlemen's Hitching Cord	35
Weight Cord	35
Hitching Weight	50
Driving Reins	40
Hammock Ropes	60 & 20
Flexible Curry Comb and Sweat Scraper	35
Baling Iron	35
Adjustable Web Halter	35
Web Halter	35
Bull Leads	35
Snap	35
Soldering Irons	35
Coppers	30
Bristol Card	35
Hitching Post	35
Rod Post Hitcher	60 & 20
Stallion Chain	35
Cart Breech End Irons	35
Breeching Chains	25
Halter Chain	50
Rein Chain	60
Breast Chain, Short Snaps	50
Lengthening Snaps	35
Open Eye Breast Chain Snap	35
Breast Chain, Long Snap	50
Post Chain	60
Breast Chain, New Patent	50
Center Breast Chain Snap	45
Wheelbarrow Wheels	35

THE PENN HARDWARE CO.

The following is discount sheet No. 2, issued January 10, 1888, by the Penn Hardware Co., Reading, Pa., for whom Sise, Gibson & Co. are agents, 100 Chambers street, New York. It relates to their 1887 catalogue. In addition to the discounts given below there is a discount of 10 per cent. on all goods except Locks, which are 45 per cent. discount, net.

Apple Parers	Net
Tobacco, Root and Herb Cutters	45
Coffee Mills	30
Lemon Squeezers	35
Family Grindstones	40
Brackets, Shelf	57 1/2
Shelf	55
Shelf	45
Flower Pot or Druggists'	40
Narrow, Fast Joint	50
Broad, Fast Joint	55
Loose Joint	65 1/2
Parliament	66 1/2
Mayer's	66 1/2
Loose Pin	66 1/2
Loose Pin, Nos. 030 and 50	60
Loose Joint, No. 150	80
Loose Joint, No. 2150	75 & 10
Loose Pin, No. 250	75 & 10
Loose Pin, No. 2250	75 & 10
Loose Pin, No. 300	80
Loose Pin, Nos. 2900 and 3300	75 & 10
Loose Joint, Nos. 350 and 1350	80
Bronze Metal, Nos. 4300 and 5300	60
Nos. 4350 and 5350	60
Plain Bronze, Nos. 6150 and 6250	60
Inside Shutter	65
Hinges, Lull & Porter's	66 1/2
Surface Blind	39 1/2
Shutter Catches and Lifts	50
Grape Arbor Posts	45
Turnbuckles	45
Bolts, Tower and B. K. Barrel	60
Barrel	60
Flat Shutter	60
Lever Foot	60
Chain, Japanned	65
Square Door, Nos. 108 to 3134	65
Square Door, Cast Brass	50
Square, Bottom and Chain	65
Flush, Bronzed	60
Flush	60
Flush, Bronze Metal	55
Flush, Plain Bronze, Nos. 6450 and 6550	55
Mortise Flush	55
Bolts, Flush, Brass	50
Chain Door Fasteners	60
Door Buttons	60
French Window Catches	55
Cupboard Catches	60
"	70
"	55
Cupboard Turns	60
Closet Door Catches	50
Wardrobe Locks	60
Screen Door Catches	60 & 5
Thumb Latches	60
Thumb Latches, Frozned	60
Barn Door Latches	50
Store Door Handles, Japanned	50
"	60
"	Nos. 912, 6012 and 7012
"	45
"	55
"	Nos. 6020 and 6025
"	40
"	and Lock
"	50
"	and Lock
"	60
Door Pulls	55
Push Plates	60
Drawer Pulls	66 1/2

Chest Handles	65
Hooks, Clothes Line, orange list	60
Nos.	5 15
	\$0.90 1.00
Hooks, Hat Rack and Backs	50
" Harness	55
" Hotel or School House	55
" Hat and Coat	55
" Brass, Hat and Coat	55
" Wardrobe and Ceiling	55
" Bird Cage	60
Pulleys, Upright and Side	60
" Brass Screw	55
" Japanned Screw	60
" Tackle or Awning	60
" Frame and Axle	20
Sliding Door Rail	55
" Stops	55
" Shelves	55
Sash Locks	45
Drop Cupboard Bolts	35
Sash Centers	35
Shutter Knobs, with Fast Screw	60
" with Loose Screw	65
Drawer Knobs	65
Shutter or Sash Knobs	50
Picture Knobs	65
Sash Lifts	60
" Flush	55
Sash Pull Plates	55
" Hooks	60
Shutter Bars	60
Sash Fasteners	55
Barn Door Hangers, N. S. 4 to 54	30
" Nos. 61 to 65	45
" Rollers	38 1/2
" Stays	25
" Pulls	65
" Rail	25
Hay Fork Pulleys	25
Grindstone Fixtures	25
Porch Irons	25
Well Wheels	35
Bed Fasts	40
Castors, French, Bed and Piano Forte	45
" Cabinet Organ	55
" Store Truck	45
Window Shade Brackets and Roller Ends	30
" Racks	30
Floor Clamps	Net
Quitting Frame Clamps	50
Coffee Pot Stands	40
Sad Irons	10
Sad Iron Stands	55
Toy Iron Jacks	50
Toy Sad Irons and Stands	50
Flat Nose Pliers	65
Cutting Nippers	65
Savings Banks	35
"	50
Paper File Hooks	25
Inkstands	35
Chandelier Hooks	50
Lamp Brackets	40
Wire Lamp Harps	40
Lamp Stands	40
Locks	45
Sliding Door Pulls	45
Flush Cup Escutcheons	45
Mortise Bolt Knobs	45
Closet Door Knobs	45
Door Knobs	45
Turn Knobs and Roses	45
Plain and Swivel Spindles	45
Side Knob Screws and Spindle Washers	45
Bell Pulls	45
Escutcheons	45
Keys	45
Strikes	45

ITEMS.

Horton, Gilmore, McWilliams & Co., successors to Wm. Blair & Co., Chicago, Ill., issue a convenient trade circular in which some leading lines of Steel Goods, Wood Goods, Floral Sets, Wrenches, &c., are illustrated, a prominent place being given to Tin Plates, Metals, &c. The following special notice is given a conspicuous place:

No person will be required or permitted to collect or receive money from any of our customers, for our account, without written authority from us, nor will we be held responsible under any circumstances for money borrowed, or indebtedness created by any person representing himself as our agent. Drafts made upon us by our agents for money will be upon blanks furnished by us, to which will be attached our authority for making the same, and which must accompany the draft. We will not be held responsible for any loss resulting from a violation of these rules. They are deemed necessary for the convenience and protection of our agents and customers, as well as ourselves, and are no reflection on our traveling salesmen, who have our fullest confidence and support.

The condition of trade and the outlook are referred to as follows:

Business in our line is dull, as usual, at this season of the year, with a promising outlook for the future. The market is without any noticeable change, but with a strong feeling and an upward tendency on general goods, and a decided advance, which is firmly held, on Tin Plates, Zinc, Lead, and all their products. Nails and Barbed Wire are good property at present prices. All orders entrusted to us, whether through our agents or sent to us di-

rect, will receive the same careful attention as in the past, and by prompt and careful shipments, good goods, no substitutions, low prices and fair dealing we expect to hold a fair share of the trade.

Announcement is made that at a meeting of the stockholders of the A. F. Shapleigh & Cantwell Hardware Company, held December 24, 1887, St. Louis, Mo., the name of the company was changed to the A. F. Shapleigh Hardware Company.

The Ireland Mfg. Company, Cincinnati, Ohio, for whom W. H. Jacobus, 90 Chambers street, New York, is agent, have issued a new catalogue, bearing date January 1. This catalogue comprises their old line of goods, with many additions, and is about double the thickness of their issue for 1887. The company have slightly advanced the list of some Sash Locks and reduced the list of others, the discounts remaining the same as before.

Announcement is made January 12 that W. K. Boone & Co., Lima, Ohio, have taken J. J. Ewing, who for the past 16 years has been engaged in the Hardware business at Columbus Grove, Ohio, into partnership, and that their business will be continued at the old stand under the name of W. K. Boone & Co., and under substantially the same arrangement and management as heretofore. Acknowledgment is made of the patronage given the firm in the past, and reference is made to the increased facilities of the company, which will enable them to serve the trade better than ever.

The Brattleboro Tool Company, Brattleboro, Vt., announce January 11 that they have sold to C. E. Jennings & Co., 79 Reade street, New York, their entire stock of Planes, and the good will of the business. They also give them the entire control of the manufacture and sale of their improved and perfected Adjustable Extension Bit, to the quality of which they allude.

The Baeder Flint Paper Company, 283 Pearl street, New York, have appointed John H. Graham & Co., 113 Chambers street, New York, as selling agents, who are in a position to supply any demand for the company's product at factory prices. It will be remembered that this company are not in the combination of Sandpaper manufacturers.

The revised United States standard list on Cold Punched Square and Hexagon Nuts will be found in another column. A United States Standard list of Chamfered, Trimmed and Reamed Hot-Pressed or Cold Punched Square or Hexagon Nuts has also been adopted, both of these going into effect January 1. The manufacturers' standard list remains as before. The negotiations with a view to forming an association among the manufacturers of these goods are continued, but no definite result has yet been reached.

Abraham Bussing, president of the Ausable Horse Nail Company, informs us that A. W. Kingsland has been appointed general agent of their company for the Western States.

The Pope Mfg. Company, Boston, Mass., have issued their 1888 catalogue, in which they give a full description of their line of Bicycles, Triycles, &c., including the Light Roadster, Expert, Volunteer, Veloce, Safety, Semi-Roadster, Standard and Racer Columbia Bicycles, among which the Volunteer and Veloce are referred to as new, and the Light Roadster, adds Two-Track, Tandem and Racer Columbia and Surprise Tricycles, the latter being a new machine. The catalogue, which contains a variety of interesting matter, is very neatly printed and fully illustrated.

The Wayne Works, Richmond, Ind., successors to the Wayne Agricultural Co., issue a circular announcing the purchase

U. S. Standard List of Cold Punched Square and Hexagon Nuts.

Adopted by the Association December 7, 1887. To take effect January 1, 1888.

Wide.	Thick.	Hole.	Bolt.	Square, cents per pound.	Hexagon, cents per pound.	Wide.	Thick.	Hole.	Bolt.	Square, cents per pound.	Hexagon, cents per pound.
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{13}{64}$	$\frac{1}{2}$	13.8	21.0	$1\frac{1}{8}$	$1\frac{1}{2}$	$\frac{15}{16}$	$1\frac{1}{2}$	8.4	10.0
$\frac{3}{8}$	$\frac{5}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	12.8	19.0	2	$1\frac{1}{4}$	$1\frac{1}{16}$	$1\frac{1}{4}$	8.8	10.5
$\frac{1}{2}$	$\frac{3}{8}$	$\frac{13}{64}$	$\frac{3}{8}$	11.0	14.7	$2\frac{3}{16}$	$1\frac{5}{8}$	$1\frac{5}{16}$	$1\frac{5}{8}$	8.8	10.5
$\frac{5}{8}$	$\frac{7}{16}$	$\frac{11}{32}$	$\frac{7}{16}$	10.5	13.7	$2\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{9}{16}$	$1\frac{3}{4}$	9.6	11.3
$\frac{3}{4}$	$\frac{1}{2}$	$\frac{5}{16}$	$\frac{1}{2}$	9.3	11.5	$2\frac{9}{16}$	$1\frac{7}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$	9.6	11.3
$\frac{7}{8}$	$\frac{9}{16}$	$\frac{3}{8}$	$\frac{9}{16}$	9.3	11.5	2 $\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	10.2	12.1
$1\frac{1}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{5}{8}$	8.9	10.7	$2\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	10.2	12.1
$1\frac{1}{4}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{3}{4}$	8.6	10.2	$3\frac{1}{8}$	2	$1\frac{13}{16}$	2	10.6	12.6
$1\frac{3}{8}$	$\frac{7}{8}$	$\frac{15}{16}$	$\frac{7}{8}$	8.6	10.2	$3\frac{5}{8}$	$2\frac{1}{4}$	$1\frac{13}{16}$	$2\frac{1}{4}$	11.0	13.0
$1\frac{1}{2}$	1	$\frac{15}{16}$	1	8.4	10.0	$3\frac{1}{2}$	$2\frac{1}{4}$	$1\frac{13}{16}$	$2\frac{1}{4}$	11.5	13.5

All previous lists and quotations withdrawn. Prices subject to change without notice.

of the entire plant of the Wayne Agricultural Co., to whom they are successors, and state that they will continue the same line of business and will be in the market this season with a full line of the goods manufactured by the old company, with some improvements.

Greene, Tweed & Co., 83 Chambers street, New York, issue a special sheet of Steam and Hydraulic Packings, on which list prices are given without the mention of trade discounts.

Clark Mfg. Company, Buffalo, N. Y., advise us that they have secured William W. Murray, who is well and favorably known to the trade, to represent them in the West and Northwest. They also intimate that they are in a position to furnish promptly their Blind and Gate Hinges and other goods.

Chas. Harrison & Co., 16 West Fourth street, New York, issue, January 1, a compact net price list of Plumbers', Gas and Steam Fitters' Tools. It contains nearly 100 fully illustrated pages, and will be found very convenient for the purpose for which it is designed.

The Shepard Hardware Company, Buffalo, N. Y., issue a circular of their Lightning Ice-Cream Freezer, to the special features and merits of which they call particular attention. The point is emphasized that this Freezer is operated by a quadruple motion, and that it has their new wheel dasher, which is alluded to as making the cream especially light and palatable, and increasing the quantity put into the can.

Charles J. Healy & Co., 26 Warren street, New York, issue a circular calling attention to the fact that they are offering a full line of Table Cutlery of their brand, "Bridgeport Knife Co., New York," of which they carry a full and well assorted stock. They announce that they will issue February 1 a pocket edition of the Cutlery catalogue. $4\frac{1}{2}$ x 7 inches.

October 19, 1887, is referred to by one of our correspondents as a red letter day in the history of Paducah, Ky., "it being the day selected for the reunion of the blue and gray," when there were over 15,000 strangers in the city. The main feature of the day was the industrial trades display, in which all the industries of the city were

represented. Prominent among the displays was that of Scott, Stevens & Co., the well-known Hardware merchants. They were represented by two large floats devoted to Hardware and Stoves. The Hardware float was drawn by four white and two black horses, and the Stove float by two white and two gray horses. The Hardware float is referred to as being especially attractive and impressive, and the photograph which has been sent us indicates the ingenuity and skill used in arranging it. These floats were arranged by F. L. Scott of the above firm.

Brainerd & Co., of 97 Chambers street, New York, have been appointed agents for Zimmermann's Steel Bar Blind Fastener, which is illustrated, with list prices, in a recently issued circular.

PECK, STOW & WILCOX COMPANY, New York and Southington, Conn., issue the following discount sheet, to which reference was made in our recent issue. The goods in it are divided, it will be observed, into two classes, Class A being special goods, which are net and subject only to a cash discount of 2 per cent. beyond the price printed below; all other goods not enumerated in Class A are subject to an additional cash discount of 10 per cent.:

Tinners' Tools and Machines.	Dis. per cent.	Net
Stow's Patent Folders.....	A	"
Grooving Machines.....	A	"
Stow's Patent Encased Machines.....	A	"
Raymond's Patent Machines.....	A	"
No 1 Machines.....	A	"
Power Machines.....	A	"
Moore's Double Seamers.....	A	"
Stow's Double Seamers.....	A	5
Olmsted's Double Seamers.....	A	20
Burton's Double Seamers.....	A	5
Hulbert's Double seamers.....	A	20
Beading Machines.....	A	5
Stove-Pipe Crimper and Bender.....	A	10 $\frac{2}{3}$
Crimping Machines.....	A	5
Stove-Pipe Formers, Nos 1, 2.....	A	20
Tin " " Nos 1, 2.....	A	20
Nos. 0, 5, 0000, 000, 00 Formers.....	A	5
Stow's Improved Formers.....	A	5
Square Box and Can-Top Folders.....	A	5
Forming Machines.....	A	5
Boiler Expander.....	A	5
Reese's Roofing Tongue.....	A	Net
Spaulding's Tube Former.....	A	5
Sheet-Iron Folding Machines.....	A	5
Add Wright's Improved Sheet-Iron Folder, 30 inches, list \$16.....		5
Add Grannis's Sheet-Iron Folder 30 inches, list \$12.....		5
Patent and Improved Gutter Machines.....	A	5
Gutter Machines and Gutter Rods.....	A	20
Squaring Shears.....	A	15
Continuous Slitting Shears.....	A	5
Circular Shears.....	A	5
Combined Bench and Slitting Shears.....	A	20

Samson Punch.....A	5	Carpet Stretchers and Tack Claws.....33 1/4	Cast Brass Flush Rings.....50	
Waugh's Circular Shears.....A	10	Shoe Hammers.....30	Pend-nt Drawer Pulls.....40	
Shear and Punch.....A	5	Peck's Patent Braces.....A 60&10	Drawer and Lifting Handles.....50&10	
Tinners' Shears and Snips.....A	20	Bit Braces.....50	Cast Brass Lifting Handles.....50	
Berridge's Double Cutting Shear.....A	20	Saw Bods.....33 1/4	Japanned Lifting Handles.....40&10	
Hawk's Bill Shear.....A	50	" Sets.....33 1/4	Chest Handles.....50&10	
Cotton Bale Snips.....A	2 1/2	Cheese and Butter Triers.....25	French Window Shutter Handles.....40&10	
Snips and Plater's Shears.....A	20	Add Ratchet Screw-Drivers.....10	Trap-Door Rings.....50&10	
Shear Holder and Patent Gauge.....A	5	Screw-Drivers.....60	Door Knobs.....50	
Bench Plates.....A	20	Box Scrapers and Chisels.....40&5	Escutcheons.....50	
Hammers.....A	3 1/4	Cold Chisels.....70	Letter-Box Plates.....40&10	
Set Tinners' Tools.....A	20	Box and Cotton Hooks.....50	Store-Door Handles.....25	
Wrought Stakes.....A	20	Vises.....33 1/4	Add Barn-Door Catch.....20	
Wrought and Cast Stakes.....A	20	Geared Breast Drills.....40&10	Barn door Bolts.....33 1/4	
Swedges.....A	20	No. 4 Nickel-plated Drill.....25	Barn-door Latches and Catch.....20	
Square Pan Machines.....A	5	Add No. 5 Breast Drill. Same as No. 4, not nickel-plated, \$3.60.....25	Add Cottage Latch—No. 29, doz., \$1.....25	
Soud Punches.....A	50	Add Whitney's Ratchet Drill.....40	Thumb Latches.....25	
Hollow Punches.....A	20	Ratchet Drills.....16 1/2	Door Pulls.....33 1/4	
Rivet Sets and Chisels.....A	60	Blacksmiths' Drills.....10	Add Screen Door Pull—No. 7, per doz., \$0.39.....33 1/4	
Farmer's Rivet Sets, same list.....A	70	" Shoeing Pincers.....30	Hat and Coat Hooks.....40	
Hand Groovers.....A	20	Butteris and Farriers' Hammers.....33 1/4	Add Hat and Coat Hooks with Wrought Screw—No. 33, Japanned, per gross, \$3.60.....40	
Tinners' Awls and Cutting Nipper.....A	25	Steel Traps.....55&5	No. 133, Coppered, per gross, \$3.60.....40	
Add Hare's Four Leaf Cornice Brake.....A	50	Wagon Jacks and Jack Screws.....30	Wardrobe Hooks.....40	
Tinners' Mallets.....A	20	Bench Screws.....25	Schoolhouse Hooks.....40	
Cornice Brake.....A	20	Door Clamps.....30&10	Clothes-Line Hooks.....40	
Roofing Tools.....A	20	Quilt Frame Clamps.....30	Harness Hooks.....40	
Add Improved Roofing Tongs.....A	20	Shaw's Clamps and Hand Screws.....10	Chandelier and Ceiling Hooks.....50	
Bell's Roofing Eger.....A	net	Cabinet Clamps.....30	Lamp and Cabin Hooks.....40	
Roofing Double Seamers.....A	net	Carriage-Makers' Clamps.....37 1/4	Drive and Screw Hooks.....50&10	
Tinners' Press.....A	net	Ice Picks and Ice Axe and Picks.....33 1/4	Molding and Mirror Hooks.....50&10	
Sundry Machines and Parts.....A	net	Scratch Awls.....33 1/4	Cup Hooks.....50&10	
Tinners' Hardware.				
Box Coffee-Mills.....A	50	Steelyards.....30	Hammock Hooks.....50	
Side Coffee-Mills.....A	45	Scale Beams.....40	Bird-cage Hooks.....50	
Candlesticks.....25		Spring Balances, Nos. 10, 20, 30.....35	Casters, Brass or part Brass.....40	
Flue stops.....33 1/4		40, 50.....25	Casters.—See revised Caster list in <i>Iron Age</i> , January 12, 1888.....40&10	
American Snuffers.....No goods		T-a and C. counter Scales.....25	Bed Keys.....40&10	
Plumbers' Scrapers.....25		Dixon's Meat Cutters.....20	Bedstead Fastenings.....40&10	
Paste Jiggers.....20		Hale's.....60	Ox Bow Pins.....50	
Coppers, subject to change.....30		Little Giant Meat Cutters.....30&10	Cattle Leaders.....55	
Soldering Copper Handles.....40		Meat Cutters.....20	Steel Bull Rings.....50&10	
Plumbers' Lades.....33 1/4		Sausage Fillers.....33 1/4	Copper Bull Rings.....60	
Add Improved Melting Lades.....33 1/4		Cherry Seeders.....40	Ox Balls.....40&10	
Wire Gauges.....16 1/2		Tobacco Cutters.....30	Plumb Bobs.....50	
Fire-Pot, No. 1.....16 1/2		Pierce's Electric Bell.....25	Hitching Rings.....60	
" No. 2.....30		Door Bells, change list:	Hog Scrapers.....40&10	
Tinners' Soldering Pan.....30		Nos.....905 910 915	Pruning Shears.....50&10	
Malleable Kettle Ears.....30		Add No. 07 Bell Lever, per doz.....\$2.15	Nut Crackers.....50	
Kettle and Tea-Kettle Ears.....30		Change list, No. 0560 to \$1.65.....	Garden Forks and Trowels.....40&10	
Malleable Ears and Clips.....33 1/4		Door Bells and Levers.....20	Boat Jacks.....50	
Milk-Can Handles, Plain, Copper Bronzed and Japanned.....40		Trip Gong Bells.....20	Foot Scrapers.....50	
Milk-Can Handles, Tinned.....30		Alarm Door Bells.....20	Kitchen Grindstones.....20	
Malleable Clips, Tinned.....37 1/4		House Bells on Carriages.....16 1/2	Grindstone Fixtures.....40&10	
Toilet Handles.....25		Slide Bell Pulls.....30	Strap and T Hinges.....A 70&5	
Saucepan Handles.....25		Bell Cranks.....30	Hinge Hinges.....A 70&5	
Tea-Pot Handles.....33 1/4		Bell Cranks, Spikes and Springs.....30	Hook and Plate Hinges.....40	
Waffle Iron and Coffee Roasters.....10		Hand Bells.....30	Wrought Butts and Hinges.....A 65	
Toy Sad-Iron Stands.....33 1/4		Call Bells.....25	Spring Hinges.....50&10	
Sad-Iron Stands.....33 1/4		Flush Bolts.....35	Loose Pin Butts, No. 1.....A 70	
Coffee-Pot Stands.....30		Kenington Bronzed Bolts.....40	Make void Nos. 10 and 20.....A 70	
Stove Cover-Lifters.....25		Cast Brass Flush Bolts.....30	Bronze Plated Butts, No. 200.....A 85	
Stove Pokers.....50&10		Mortise Front Door Bolts.....30	No. 10, Cast Butts.....A 70	
Coal Tongs.....25		Chain Door Fasteners.....33 1/4	No. 70, ".....A 70	
Coal Shovels.....33 1/4		Chain Door Bolts.....35	Loose Pin Butts, Nos. 50 and 60.....A 85	
Stove Pipe Damper, plain.....55		Bottom Bolts.....40	Blind Hinges.....65	
Stove Pipe Damper, nickel.....40		Spring Foot Bolts.....40	Hinges and Gate Latches.....55	
Shovel, Tongs and Pokers.....50&10		Square Spring and Square Bolts.....40&5	Barn-Door Hangers.....40&10	
Shovel, Tongs and Pokers, Nos. 54, 55.....55		Nos. 415 and 417 Wrought Bolts.....66 1/2	" Stays.....40&5	
Shovel, Tongs and Pokers, Nos. 10, 20.....65		No. 503, Cast Spring Bolts.....40&10	" Rollers.....40&10	
Shovel and Tongs Stands.....50&10		Wrought-Iron Square Bolts.....60&10	Sliding-Door Sheaves.....55	
Fire and Kitchen Sets.....60		Cast Brass Square Spring Bolts.....25	Barn and Sliding Door Rail.....40	
Blower Stands.....50&10		" Neck Bolts.....30	Steel Hammers.....20	
Iron Fire Dogs.....50&5		No. 425, Wt. Square-Necked Bolts.....66 1/2	Riveting, Machinists' and blacksmiths' Hammers.....15	
Brass Andirons and Fenders.....50&5		No. 504, Cast Square-Necked Bolts.....40&10	Saddlers' Punches.....50&10	
Umbrella Stands.....60&5		Barrel Bolts.....40	Tack and Nail Puller.....50	
Match Plates and Safes.....40		Nos. 500, 506, Cast Barrel Bolts.....40&10	Agricultural Screw-Driver.....50	
Towel Rollers.....50		Wrought Barrel Bolts.....60&10	Flower Pot and Lamp Bracket.....30&10	
Book Racks.....40&10		Cast Brass Barrel Bolts.....40	Shelf Brackets.....40	
Stove Bolts.....A 50&10		Iron Knob Tower Bolts.....40&10	Flower Basket.....40	
General Hardware.				
Robinson's Wrenches.....A 60&10		No. 502, Flat Shutter Bolts.....40&10	Twine Boxes.....40&5	
Mechanics' Wrenches.....No goods		No. 505, Lever Bolts.....40	Erasers.....40&5	
Machinists' Wrenches.....A 75		Japanned Staples.....50	Card Racks.....40&5	
Agricultural Wrenches.....A 80		Flat Ship Bolts.....45	Ink Stands.....40&5	
Hayden's Pocket Wrenches.....A 75		Straight Cupboard Bolts.....45	Paper Files.....40&5	
Steel and Iron Squares.....A 70&10		Flat Cupboard Bolts.....40&10	Cips.....40	
Tinners' Rule.....10		Brass Show Case Catches.....33 1/4	Weights.....40&5	
Clapboard Gauge.....10		Flush Cupboard Catches.....40	Carriage and Saddlery Hardware.	
Wing Dividers.....60		Brass Flush Cupboard Catches.....33 1/4	Common Carriage Bolts.....A 70&10	
Calipers and Compasses.....50		Cupboard Latches.....40	Phil. Pat. Carriage and Tire Bolts.....A 80	
Flat and Round-Nosed Pliers.....10		Cupboard Catches.....40	Eagle Carriage and Tire Bolts.....A 75, 5&5	
Carpenters' Pincers.....40&10		French Window Catches.....33 1/4	Machine Bolts.....A 75	
Add 6 inch.....per doz., \$5.25		Cupboard Turns.....40	Boat Ends.....A 75	
Socket Firmer Chisels, No. 1 Ex.....60&10		Screen-Door Catches, Nos. 53, 55.....40	Coach Screws.....A 75&5	
Socket Firmer Chisels, No. 1.....60, 10&5		Nos. 52, 54.....40	Gimlet-Pointed Coach Screws.....A 75	
Socket Framing Chisels.....60&10		Transom and Screen-Door Catches.....40	Sleigh-Shoe Bolts.....70	
Socket Corner Chisels.....60&10		Door Buttons.....33 1/4	Plow Bolts.....50	
Carpenters' Slicks.....60&10		Sash Fast.....33 1/4	Iron Washers, new list.....A 5¢ off list	
Socket Framing Mill Chisels.....60&10		Sash Locks and Window Casters.....33 1/4	Square Nuts, old list.....A 5¢ " "	
Socket Firmer Mill Chisels.....30		Shutter Bars.....40	Hexagon Nuts, discarded.....A 5¢ " "	
Socket Paring Chisels.....30		Sash Lifts.....33 1/4	Tubular Lantern Holder.....50	
Extra Tanged Firmer Chisels.....20&10		Sash Pulls.....40	Carriage Bands.....50	
Extra Tanged Firmer Gouges.....20&10		Shutter Lifts.....33 1/4	Knobs.....30	
Socket Firmer Gouges.....10		Sash Lifts and Locks.....40	Shaft, Hame and Whiffletree Tips.....50	
Socket Firmer Millwright Gouges.....30		Shutter Knobs.....30	Neck Yoke Tips and Poie Tips.....50	
Socket Firmer Paring Gouges.....2 1/2		Stubs and Plates and Shutter screws.....30	Club Handles.....50	
Ratchet Braces and Bits.....50		Window Spring Bolts, change list:	Whip Sockets.....33 1/4	
Socket Firmer Chisels, in boxes.....10		Nos.....110 115 120 137	Inside Coach Handles.....50	
Drawing Knives.....60&10		Per gross.....\$1.75 1.75 2.25 3.75	Spring Bar Bolts.....50	
Change list of Shingling Hatchets:		Window Spring Bolts and Sockets.....40	Harness and Breaching Dees.....33 1/4	
Nos.....1 2 3		Window Springs.....33 1/4	Cockeyes and Pad Trees.....30&10	
Per doz.....\$8.00 8.50 9.00		Add Window Springs to Screw.....33 1/4	Curry Combs.....A 50	
Change list of Claw Hatchets:		No. 27, Brass Bolt, per gross.....\$7.00	Henry Seymour Cutlery Company, Holyoke, Mass., for whom Wiebusch & Hilger are sole agents, 84 and 86 Chambers street, New York, have issued a new catalogue and price list showing their extensive line of Shears, Scissors, Sheep Shears, &c. Among these goods a prominent place is given to their Adjustable Lever Spring and Bolt Tailor Shears, of which we gave a description in a recent issue. Sheep Shears, also an important line, are prominently represented, with illustrations of the leading patterns.	
Nos.....1 2 3		No. 29, Iron Bolt, per gross.....\$5.00		
Per doz.....\$9.00 9.50 10.00		Sash Cord Irons, Centers and Props.....40		
Change list of Lathing Hatchets:		Trunk and Sash Rollers.....31		
Nos.....1 2 3		Axle and Frame Pulleys.....30		
Per dozen.....\$8.00 8.50 9.00		Dumb Waiter Pulleys.....10		
No. 1 Extra, Hatchets.....33 1/4		Hay Fork Pulleys.....35		
Boys' Axes.....33 1/4		Add No. 14, 4 1/2 inch list. Per doz.....\$2.80.....35		
Bush Hooks.....30		Screw and Side Pulleys.....25		
Butchers' Cleavers.....20		Upright and Yard Line Pulleys.....30		
Corn Hooks.....25		Clothes-Line Pulleys.....30		
Cast Hatchets.....25		Hot-House and Awning Pulleys.....30		
Steak Hammers.....25		Nos. 740, 1740, 760, 1760 Pulleys.....30		
Nail.....33 1/4		Sliding Shutter Sheaves.....30		
Tack.....33 1/4		Encased Swivel Pulleys.....30		
Nantucket Drivers.....25		Well Wheels and Hooks.....33 1/4		
		Drawer Pulls.....30		
		Card Frames.....50&5		

SUGGESTIONS FOR STORMY DAYS.

The following letter from a correspondent in the trade touches upon a subject in which all enterprising stove and hardware dealers are deeply interested. No doubt many of them have been following the suggestions contained in our correspondent's letter for years, and know the gratifying results of a well ordered and systematically arranged store; but there may be others in the trade who will derive benefit from its perusal, and to their attention we commend it. Our correspondent says:

There are a number of ways of spending one's time in a hardware store when the weather or other causes may prevent the desired customers from calling. As good a way as any is to take the goods off from one shelf, give them a good dusting, see that they are done up in good shape, and put back so they look as orderly as circumstances permit. There is no excuse for having the goods on the shelves look as if they had been fired out of a cannon, and a dirty one at that, when a few hours' time now and then will make the store look as if a live person kept it.

Sometimes a customer enters in a hurry for a pound of Nails, which it takes some time to weigh and do up. It would not be a bad idea in anticipation of just such emergencies to have a few packages of Nails neatly tied up, so the customer could have them as soon as asked for. He would probably depart with a happy smile on his face, and, best of all, return again when he wished to make another purchase.

In most every store there is to be found a collection of odds and ends that are not quite good enough to sell, and are too valuable to throw away. These "chest-nuts" should be gathered together and placed on the bargain counter, with the price marked thereon, so any one could look them over, and determine without asking questions whether a purchase was desirable or not.

Many people would like a collection of various sized Nails or Screws, and would be willing to give 5 or 10 cents for them. Why not make a few such collections, which could be placed in boxes, and the price marked thereon, so any one could look at the collections, and determine which they would desire.

Stove-Pipe Wire is an article that many require, and it should be kept in coils that can be sold at a profit for 5 cents each. When a customer comes in for a "hank" of Wire, do not be obliged to send the boy up into the tinshop with a message to the foreman for a piece, and then have the foreman give the order to one of the "cubs" for said Wire, with the chance that the "cub" will not know where the Wire is, and come racing down into the store asking for Wire for the foreman, with the result that the whole place, or the people in it, will be badly torn up before the wire is found, and the customer loses what little courage he may have had for the anticipated battle with his Stove-Pipe.

If it does not rain too hard give the front windows a washing, so that the passer-by will not require an opera-glass to see what is in the show-windows, and, after the windows have been made clean, why not put in something new, so that it will be attractive to the eye. A festoon of Dog-Chains hung about a Coal-Hod is better than nothing—anything for a change.

A valuable lesson can be learned by attending a fair and noticing how people look at the various article displayed, which they have, without doubt, seen all before, only not under the same conditions. Have your windows a "county fair." This may not be the time of the year for house-cleaning, but any time of the year is a good time to have a clean house or store. It will not cost much to give the walls a coat of whitewash, and, perhaps, the edges of the shelves a coat of paint.

Kerosene is quite cheap now, but when the walls of a store are nice and white one lamp is as good as two, and your customers will notice that you are alive, and will remember you as a lively man and one that is bound to get on in the world.

Keeping the sidewalk clean in front of the store is something that can be done any day, the best, perhaps, after a snow storm. The storekeeper who has his sidewalk cleaned first will be the first to attract attention, and this is a cheap kind of advertising.

Dust on goods is a source of loss, besides making them look old. If sawdust is to be had, take some of it in a pail, wet it, and sprinkle it over the floor before sweeping; then the dust will be taken up, and not thrown into the air to come down again. When the articles in the store are being dusted the doors should be left open, so the air will circulate through and carry off the dust as it is swept from the goods. This will give the store a fresh

be apt to rain for some time, a snowy day may do to carry out some of the suggestions contained in the above.

THE ARRANGEMENT OF HARDWARE STORES.

We have the pleasure of continuing the description of the store of C. P. Sherwood, White Plains, N. Y., of which some illustrations were given in our issue of last week. Those that follow relate, it will be observed, to his Iron Rack, Nail Counter, case for Zinc Boards, Bracket for Shovels, Spades, &c., and a device used in the tinshop. Concerning these detailed information is given below. These illustrations, with the plan given last week, indicate the arrangement of Mr. Sherwood's store, and show something of the taste and ingenuity used in the display and accommodation of goods.

The Iron Rack shown in Fig. 172 consists of a series of compartments formed by a framework of wood and iron. Pieces of 2 x 4 dressed studding form the ver-

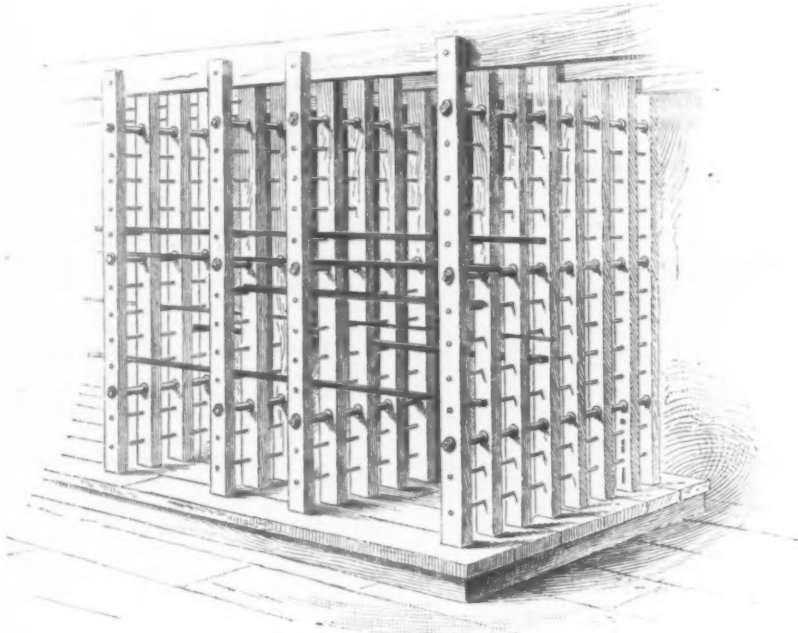


Fig. 172.—Iron Rack.

smell, and, the air being pure, every one will feel better than if they were breathing air that has been on hand for a month or so.

One of the best jobs for a rainy day is to clean the glass of the show-case, and if there is any metal about it have that shine like the African's heel on a frosty morning. The contents of the case should be arranged so that everything will appear to the best advantage. To lay a foundation for this effect, take everything out of the case; then, after having given the articles a good wiping, put them back again. They would hardly get back again in the order they were before.

There is nothing so much to be desired as friends, yet it is not a good plan to have a store turned into a club or smoking-room evenings. This remark does not apply so much to a hardware store as it does to a grocery. When ladies come down town of an evening they do not like to go in a store where there are a lot of loafers sitting and be subjected to the remarks that are sure to be made by such people after a lady goes out, or to breathe air that is mainly composed of tobacco smoke. A rainy day is a good time to throw all the old boxes that can be used for seats into the back yard or make them into kindling wood.

A rainy day is a good time to take an inventory, not of what you do have, but of what you do not have, then when an order is to be made out it can be made with neatness and dispatch. If the reader lives in a section of the country where it will not

tical divisions, while rods passed horizontally through these at regular intervals serve at the same time to make the horizontal divisions, and to hold the pieces of studding into a solid framework. Sleeves formed of pieces of gas-pipe equal in length to the spaces between the studs are slipped over three of the rods near the top, middle and bottom of each section of the framework, the studs being thus held firmly in position. A washer is also slipped over the rod between the ends of each piece of pipe and the wood, to prevent the ends of the pipe from being forced into the wood when the nuts at either end are tightened. The upper ends of some of the studding are fastened to the joists of the ceiling, while at the bottom the entire structure rests upon a low platform.

The form of Nail Counter used is shown in Fig. 173. From this it will be seen that the Nail Counter is double faced, with a curved bottom, there being above each bin a space for such other goods as may conveniently be placed there.

The Shovel Rack is substantially the same as one which we have already illustrated in these columns, except that the long pins for holding the Shovels, Rakes, &c., are made of cast iron in the form shown in Fig. 174. On the third floor, where Shovels, Spades, &c., are kept in stock, they are separated from each other by a galvanized-iron tube screwed into a socket, which is fastened by a strip of wood on the wall. The accompanying illustration, Fig. 175, represents a neat and convenient Rack

for holding the different sizes of Stove Boards. The open stairway shown in the plan given last week is finished to correspond with the other woodwork of the store and leads from the rear of the store to the tin-shop above, which occupies half of the second floor, the room where the stock is held occupying the front. The floor of the tinshop consists of a double thickness of boards, between which layers of felt paper are laid to deaden the sound. The posts of the work-benches are also raised upon cushions of rubber $\frac{1}{4}$ or $\frac{1}{2}$ inch thick to prevent jarring from the use of hammers, &c., and also to diminish the noise. The stairway leads from the tinshop to the third floor, which is also used for the storage of additional stock. In the cellar, the floor of which is covered with cement, are kept Paints, Oils, Castings, cumbersome goods, &c. An elevator, as mentioned in the article last week, runs from the cellar to all the floors, this elevator being balanced upon weights.

The device for holding Milk Cans in position while being soldered is illustrated in Fig. 176. It consists of a revolving head with a flange to go inside the bottom of the Milk Can and is referred to as an exceedingly simple and convenient device. Near the top or shoulder of the Can is a pair of casters which support it and allow it to revolve freely.

An additional warehouse is located about 30 feet back of the store and is used for

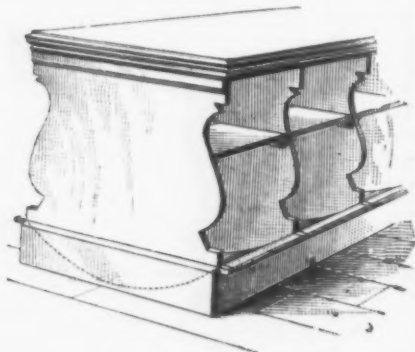


Fig. 173.—Nail Counter.

Iron and Steel. The form of rack used for Iron and Steel is shown in Fig. 172. Goods are delivered in the space between the store and warehouse by a passageway from the side street. The entire building is heated by means of a furnace with hot-air pipes running to all the floors and is furnished with speaking tubes running to the different floors.

The following illustrations, Figs. 177, 178, 179 and 180, represent the arrangement of the new

METAL WAREHOUSE

of Merchant & Co., Philadelphia, Pa. The plans indicate, it will be observed, the arrangement of the basement and the first, second and third floors, and will doubtless be regarded by the trade with much interest.

The building extends from Arch street through to Cherry street. Its depth is some 290 feet; the width is some 25 feet, being that of the average store in that part of the city. It is a three-story building and the individual stories are of sufficient height to afford abundant light and ventilation. There are few stores or warehouses in any of the large cities that are as well lighted as the one we are describing. While the building is three stories high, so far as the street fronts are concerned, it is only one story high in the central portion between what may be called the two end buildings facing on the two streets. This is indicated in the plans. A basement or cellar extends under about three-quarters of the length of the building.

Referring to the engravings, Fig. 176 indicates the basement or cellar; Fig. 177 the first floor; Fig. 178 shows the arrange-

ment of the second, or office floor, and indicates the space between the two end buildings already referred to, occupied by skylights, while Fig. 179 shows the third floor, or loft. Entering the store from Arch street, the visitor has before him a view of the whole length of the store, reaching, as we have already mentioned, 290 feet back to Cherry street. A track for convenience in propelling the trucks necessary for moving heavy goods extends the whole length of the store, as clearly indicated in the engravings. At the right, the visitor finds stairs leading to the offices, which are on the second floor. If he ascends these stairs he finds himself at the



Fig. 174.—Cast-Iron Bracket for Shovel Rack.

top, in a small vestibule, directly facing the cashier. To his right is the main office, which, it will be seen, occupies about one-third of the entire depth of the building. To the left is the private office, which is the width of the building, and in the extreme front. The private office is very neatly and appropriately finished in oak, with fireplace, and also a private closet, in which are located toilet conveniences. Going through the main office, toward the rear, the visitor is impressed with the large number of clerks necessary to the growing business of the firm. At the rear of the main office a stairway leads to the loft above, which is of special interest in this connection, from the fact that it virtually leads and communicates with an extension or annex to the office. At the head of these stairs, on the third floor there are found clothes closets, all of which are provided with special keys; an arrangement which gives each employee a space distinctively his own and one which can be kept locked against all inquisitive persons. The office arrangements of the firm are possibly of less interest to our readers than the display of goods, and therefore we will return to the lower floor.

We find underneath the stairs which we first ascended a small elevator leading to the cellar and which is of great convenience in hoisting and lowering rolls of sheet-zinc. Sheet-zinc, as will be seen on the first floor plan, is one of the departments located nearest the front, and on the basement plan it will be noticed that the storage of sheet-zinc is immediately below. This little con-

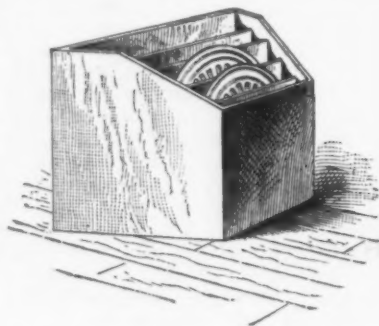


Fig. 175.—Rack for Store Boards.

venience is only one of many similar thoughtful provisions to be noticed throughout the concern. Proceeding down the first floor we find close to the sheet-zinc department, brass rods, and also on the same side of the building galvanized sheet-iron and further back sheet-copper. The wall space on the right is occupied by bins, in which are stored brass and copper tubing, and the large space occupied by this line of goods is an indication of the large assortment which this firm carry. On the left, opposite the departments that

we have already shown, will be found brass rods, sheet-brass, cold-rolled cornice copper and copper bottoms. Midway of the depth of the storeroom is found the office for the City Department, and also opening from it a private office for the manager of the City Department. Directly back of this private office is a stairway leading to the basement. Continuing our journey backward toward Cherry street, we next encounter on the left Muntz metal rods and copper rods, and on the right, black sheet-iron. Beyond this are the racks for galvanized-iron spouting, including elbows and various trimmings. In going so far upon our journey lengthwise of the store we have passed the length of the cellar or basement, and here we encounter the first piles of tin plates. A pile of tin plates 10 or 12 feet high means a weight which may well tax any ordinary support; and, therefore, ignoring all engineering features, the firm have wisely located their heaviest storage of tin plates where a solid foundation has been provided by nature instead of putting them upon a bridge built across an excavation. Tin plates are piled in very high tiers through the latter third of the depth of the warehouse, and the tons of weight involved would be an interesting calculation. The

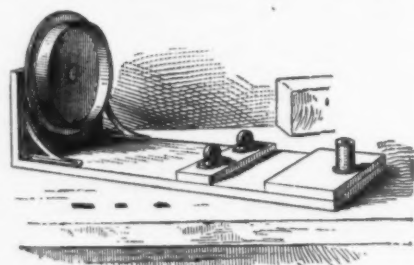


Fig. 176.—Device for Holding Milk Cans.

shipper's office is encountered amid the piles of tin plates already referred to, and is clearly shown in the drawing. The rear entrance to the building affords convenient means for receiving and shipping plates, and is so constructed that the whole width can be opened, thus allowing every possible facility for the ready handling of heavy goods.

Retracing our steps now to the space in front of the tiers of tin plates already referred to, we find a steam elevator running between the basement and the first floor; also up to the top floor. Getting upon the elevator we first go to the cellar where we find, conveniently stowed away, the engine and boiler by which power for this elevator is obtained. The basement is provided with a railway track of the same description as that already referred to on the first floor. Vaults are also built in this part of the building, fire-proof in character, for storing the old papers of the concern. The storage in the cellar consists of tin plates almost without a limit, and sheet zinc as already mentioned. The stock of wire is also kept here. The extreme front of the cellar on the Arch street end is devoted to coal bins, and there is also provided a slide from the sidewalk, being a convenient means for putting in such goods as rolls of zinc. Returning to the elevator we are carried to the second floor, where we find the storage of rivets, copper nails, stove bolts, tinsmiths' tools and machines, and tinners' trimmings. These are clearly shown in the floor plan. Again taking the elevator we are carried to the third floor in the rear building, where we find copper and brass wire, barbed wire nails, stoveboards, registers and elbows. It will be noticed that the skylight space in this part of the building is cut through to the second floor, thus conveying light direct from the roof to the lower floor where, as mentioned, tin plates are piled in such

quantities. This matter of lighting is of special interest. Hayes's skylights, constructed by J. S. Thorn, of Philadelphia, have been used throughout, and a very pretty as well as thorough job has been made of the work. Two skylights are also in place in the low roof over the building between the two end sections, and give light to the office of the city department, on the lower floor. A sort of extension light is also provided at the end of the higher building facing on Cherry street, thus giving special light to the floor at that point. Over the main office, inside skylights are placed, and in their curbs ventilators are arranged so as to give ample circulation of air at the will of those below.

Taken all in all, there are few warehouses in the country better arranged than this, and there are few offices in which so much care has been given to small details affecting the comfort of the employees. The floor of the main office is covered with

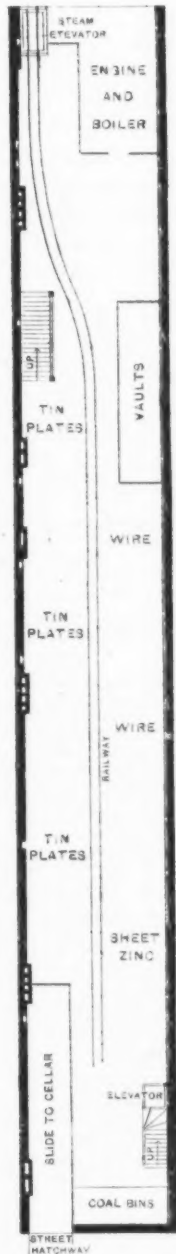


Fig. 176.—Basement.

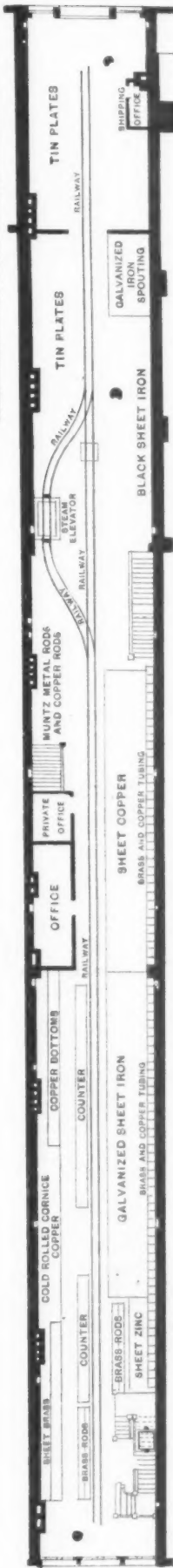


Fig. 177.—First Floor.

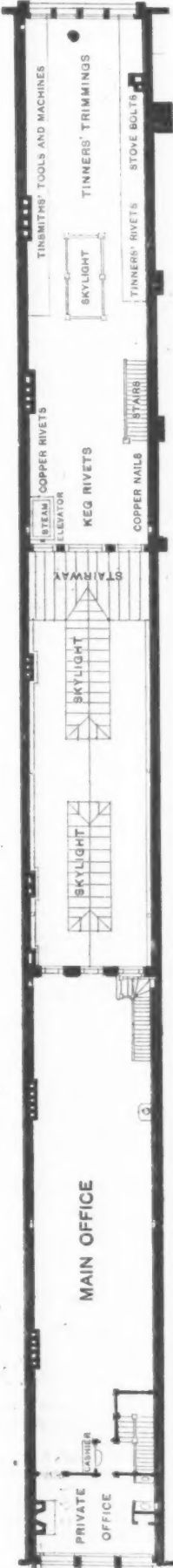


Fig. 178.—Second or Office Floor.

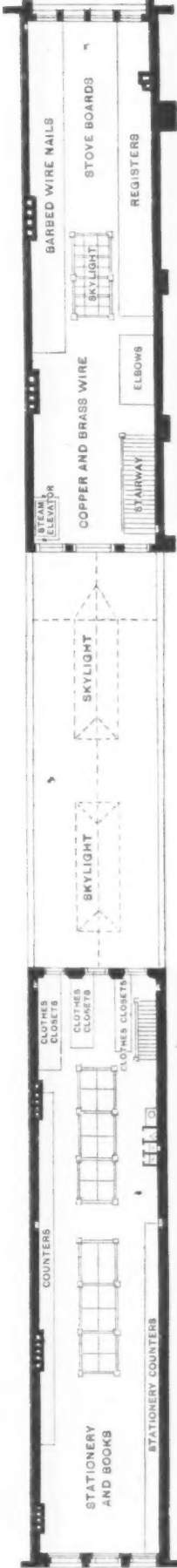


Fig. 179.—Third Floor.

Floor Plans of the New Store Building of Merchant & Co., Philadelphia. Approximate Scale, 30 Feet to the Inch.

a cork carpet, which is noiseless and elastic. The light is excellent, the ventilation is good, and a general look of cheerful enterprise prevails among all the employees. While this building gives Merchant & Co. considerable additional facilities, as compared with the quarters recently vacated, there are already indications that they are likely to be cramped for space at no distant period. Another building, standing almost immediately in the rear of the one formerly occupied, in which is located their solder department and storage for tinned sheets, is still retained by the firm.

CURRENT HARDWARE PRICES.

JANUARY 18, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Ammunition.

Cape, Feroson, 7000—	
Clarks & Goldmark's	
F. L. Waterproof, 1-10's.....	50¢
E. B. Trimmed Edge, 1-10's.....	55¢
E. B. Ground Edge, Central Fire, 1-10's.....	70¢
Double Waterproof, 1-10's.....	1.40
Musket Waterproof, 1-10's.....	52¢
G. D.	53¢
S. B.	30¢
Union Metallic Cartridge Co.	
F. L. Ground.....	50¢
Can. Fire Ground.....	55¢
Double Waterproof.....	70¢
Double Waterproof, in 1-10's.....	1.40
E. B. Genuine Imported.....	45¢
Eley's E. B.	54¢
Eley's D Waterproof, Central Fire.....	1.00

Cartridges—

Rim Fire Cartridges.....	dis 50¢
Rim Fire Military Cartridges.....	dis 15¢
Can. Fire Cartridge, Pistol and Rifle.....	dis 25¢
Can. Fire Cartridge, Military & Sporting.....	dis 15¢
Blank Cartridges, except 25 and 32 cal., an additional 10% over above discounts.	
Blank Cartridges, 22 cal.....	1.75, dis 2¢
Blank Cartridges, 32 cal.....	3.50, dis 2¢
Primed Shells and Bullets.....	dis 15¢
B. B. Caps, Round Ball.....	1.75, dis 2¢
B. B. Caps, Conical Ball, Swaged.....	2.00, dis 2¢

Primers—

Berdan Primers all sizes, and B. L. Caps (for Sturtevant Shells).....	1.00, dis 2¢
All other Primers, all sizes.....	1.20, dis 2¢

Shells—

First quality, 4, 8, 10 and 12 gauge.....	dis 25¢
First quality, 14, 16 and 20 gauge (\$10 list).....	dis 20¢
Star, Club, Rival and 10-gauge, \$9 list (dis 33¢).....	dis 10¢
Climax Brands, 12-gauge, \$8 list (dis 2¢).....	dis 2¢
Club, Rival and Climax Brands, 14, 16 and 20-gauge.....	dis 30¢
Seibold's Combination Shot Shells.....	dis 15¢
Brass Shot Shells, 1st quality.....	dis 50¢
Brass Shot Shells, Club, Rival and Climax.....	dis 65¢

Shells Loaded—

List No. 19, 1887.....	dis 20¢
J. M. C. & W. R. A.—B. E., 11 up.....	2.00
U. M. C. & W. R. A.—B. E., 22 up.....	2.30
U. M. C. & W. R. A.—P. E., 11 up.....	3.10
U. M. C. & W. R. A.—P. E., 22 up.....	4.00
Eley's B. E., 11 up.....	1.75
Eley's P. E., 11 up.....	2.80

Anvils.—Eagle Anvils.....

Wright's.....	dis 20¢
Armstrong's Mouse Hole.....	dis 15¢
Armstrong's Mouse Hole, Extra.....	dis 13¢
Trenton.....	dis 11¢
Wilkinson's.....	dis 11¢
J. & Riley Carr. Patent Solid.....	dis 11¢
Swiss Vice and Drill.....	dis 18¢
Millers Falls Co.....	dis 20¢
Cheney Anvil and Vice.....	dis 25¢
Allen Combined Anvil and Vice.....	dis 40¢
Moore & Barnes Mfg. Co.....	dis 33¢

Augers and Bits.

Douglas Mfg. Co.....	
New Haven Copper Co.....	
Wm. A. Ives & Co.....	dis 70¢
Humphreysville Mfg. Co.....	dis 70¢
French, Swift & Co. (F. H. Beecher).....	dis 70¢
Connecticut Valley Mfg. Co.....	dis 55¢
Cook's, Douglas Mfg. Co.....	dis 50¢
Cook's, New Haven Copper Co.....	dis 50¢
Ives' Circular.....	dis 30¢
Patent Solid Head.....	dis 30¢
C. E. Jennings & Co., No. 10, extension 1 p.....	dis 40¢
C. E. Jennings & Co., No. 30.....	dis 60¢
C. E. Jennings & Co., Auger Bits, in fancy boxes.	
Set, 32¢, 34¢, 36¢, 38¢, 40¢, 42¢, 44¢, 46¢, 48¢, 50¢, 52¢, 54¢, 56¢, 58¢, 60¢, 62¢, 64¢, 66¢, 68¢, 70¢, 72¢, 74¢, 76¢, 78¢, 80¢, 82¢, 84¢, 86¢, 88¢, 90¢, 92¢, 94¢, 96¢, 98¢, 1.00	
Lewis' Patent Single Twist.....	dis 40¢
Russell Jennings' Augers and Bits.....	dis 40¢
Patent Jennings' Bits (new list).....	dis 60¢
Pugh's, Black.....	dis 20¢
Car Bits.....	dis 50¢
L'Hommedieu Car Bits.....	dis 15¢
Forstner Pat. Auger Bits.....	dis 10¢

Bitless Augers—

Ives.....	dis 25¢
French, Swift & Co.....	dis 25¢
Douglas.....	dis 25¢
Bonney's Adjustable.....	dis 40¢
Stearns.....	dis 20¢
Ives' Expansive, each \$4.50.....	dis 50¢
Universal Expansive, each \$4.50.....	dis 20¢
Wood's.....	dis 25¢

Expansive Bits—

Clark's small, 18; large, 22.....	dis 35¢
Ives' No. 1, per doz., 900.....	dis 35¢
Swan's.....	dis 40¢
Stearns, No. 1, 22; No. 2, 22.....	dis 35¢
Stearns' No. 2, 24.....	dis 20¢

Bitless Bits—

Common.....	gross \$2.75—dis 25¢
Diamond.....	gross \$1.10—dis 25¢
"Be".....	dis 25¢
Double Cut, Sheardson's.....	dis 45¢
Double Cut, Cl. Valley Mfg. Co.....	dis 30¢
Double Cut, Hartwell's, 7 gro.....	dis 40¢
Double Cut, Douglas.....	dis 40¢
Double Cut, Ives.....	dis 60¢

Bit Stock Drills—

Morse Twist Drills.....	dis 50¢
Standard.....	dis 50¢
Cleveland.....	dis 50¢
Syracuse, for metal.....	dis 50¢
Syracuse, for wood (wood list).....	dis 30¢
Williams' or Holt's, for metal.....	dis 50¢
Williams' or Holt's, for wood.....	dis 40¢

Ship Augers and Bits—

L'Hommedieu's.....	dis 15¢
Watrous's.....	dis 15¢
Snell's.....	dis 15¢
Snell's Ship Auger Pattern Car Bits.....	dis 15¢

Awl Hairs.

Sewing, Brass Ferrule.....	gross \$3.50—dis 45¢
Patent Sewing, Short.....	gross \$1.00—dis 40¢
Patent Sewing, Long.....	gross \$1.20—dis 40¢
Patent Peg, Plain Top.....	gross \$1.00—dis 45¢
Patent Peg, Leather Top.....	gross \$1.20—dis 45¢

Awls, Brad Sets, &c.

Awls, Sewing, Common.....	gross \$1.70—dis 35¢
Awls, Shouldered Peg.....	gross \$2.45—dis 40¢
Awls, Patent Peg.....	gross \$3.50—dis 40¢
Awls, Shouldered Brad.....	gross \$2.70—dis 35¢
Awls, Handled Brad.....	gross \$7.50—dis 45¢
Awls, Handled Scratch.....	gross \$7.50—dis 35¢
Awls, Socket Scratch.....	gross \$1.50—dis 25¢

Awl and Tool Sets.

Allen's Sets, Awls & Tools, No. 20.....	gross \$10—dis 50¢
Tray's Ad Tool Hds., Nos. 1, 12; 2, 12; 3, 12; 4, 12.....	dis 25¢
Miller's Falls Adj. Tool Hds., Nos. 1, 12; 2, 12; 3, 12; 4, 12.....	dis 25¢
Henry's Combination Haft.....	gross \$1.25—dis 25¢
Brad Sets, No. 42, \$10.50, No. 43, \$12.50.....	dis 70¢
Brad Sets, Stanley's Excelsior, No. 2, \$1.00.....	dis 30¢
Brad Sets, Stanley's Excelsior, No. 3, \$1.50.....	dis 30¢

Axes.

Makers' and Special Brands—	
First quality.....	gross \$6.50—dis 65¢
Others.....	gross \$5.75—dis 65¢

Axe Grease.

Fraser's, in bulk.....	gross \$2.40—dis 50¢
Fraser's, in boxes.....	gross \$3.50—dis 50¢
Dixon's Everlasting, in bxs., 1 lb.....	dis 1.20
Dixon's Everlasting, 10-lb pails, each, 86¢	
Lower grades, special brands.....	gross \$5.50—dis 50¢

Axles.

No. 1, 4¢; No. 2, 5¢; No. 3, 6¢; No. 4, 7¢; No. 5, 8¢; No. 6, 9¢; No. 7, 10¢; No. 8, 11¢; No. 9, 12¢; No. 10, 13¢; No. 11, 14¢; No. 12, 15¢; No. 13, 16¢; No. 14, 17¢; No. 15, 18¢; No. 16, 19¢; No. 17, 20¢; No. 18, 21¢; No. 19, 22¢; No. 20, 23¢; No. 21, 24¢; No. 22, 25¢; No. 23, 26¢; No. 24, 27¢; No. 25, 28¢; No. 26, 29¢; No. 27, 30¢; No. 28, 31¢; No. 29, 32¢; No. 30, 33¢; No. 31, 34¢; No. 32, 35¢; No. 33, 36¢; No. 34, 37¢; No. 35, 38¢; No. 36, 39¢; No. 37, 40¢; No. 38, 41¢; No. 39, 42¢; No. 40, 43¢; No. 41, 44¢; No. 42, 45¢; No. 43, 46¢; No. 44, 47¢; No. 45, 48¢; No. 46, 49¢; No. 47, 50¢; No. 48, 51¢; No. 49, 52¢; No. 50, 53¢; No. 51, 54¢; No. 52, 55¢; No. 53, 56¢; No. 54, 57¢; No. 55, 58¢; No. 56, 59¢; No. 57, 60¢; No. 58, 61¢; No. 59, 62¢; No. 60, 63¢; No. 61, 64¢; No. 62, 65¢; No. 63, 66¢; No. 64, 67¢; No. 65, 68¢; No. 66, 69¢; No. 67, 70¢; No. 68, 71¢; No. 69, 72¢; No. 70, 73¢; No. 71, 74¢; No. 72, 75¢; No. 73, 76¢; No. 74, 77¢; No. 75, 78¢; No. 76, 79¢; No. 77, 80¢; No. 78, 81¢; No. 79, 82¢; No. 80, 83¢; No. 81, 84¢; No. 82, 85¢; No. 83, 86¢; No. 84, 87¢; No. 85, 88¢; No. 86, 89¢; No. 87, 90¢; No. 88, 91¢; No. 89, 92¢; No. 90, 93¢; No. 91, 94¢; No. 92, 95¢; No. 93, 96¢; No. 94, 97¢; No. 95, 98¢; No. 96, 99¢; No. 97, 1.00; No. 98, 1.01; No. 99, 1.02; No. 100, 1.03; No. 101, 1.04; No. 102, 1.05; No. 103, 1.06; No. 104, 1.07; No. 105, 1.08; No. 106, 1.09; No. 107, 1.10; No. 108, 1.11; No. 109, 1.12; No. 110, 1.13; No. 111, 1.14; No. 112, 1.15; No. 113, 1.16; No. 114, 1.17; No. 115, 1.18; No. 116, 1.19; No. 117, 1.20; No. 118, 1.21; No. 119, 1.22; No. 120, 1.23; No. 121, 1.24; No. 122, 1.25; No. 123, 1.26; No. 124, 1.27; No. 125, 1.28; No. 126, 1.29; No. 127, 1.30; No. 128, 1.31; No. 129, 1.32; No. 130, 1.33; No. 131, 1.34; No. 132, 1.35; No. 133, 1.36; No. 134, 1.37; No. 135, 1.38; No. 136, 1.39; No. 137, 1.40; No. 138, 1.41; No. 139, 1.42; No. 140, 1.43; No. 141, 1.44; No. 142, 1.45; No. 143, 1.46; No. 144, 1.47; No. 145, 1.48; No. 146, 1.49; No. 147, 1.50; No. 148, 1.51; No. 149, 1.52; No. 150, 1.53; No. 151, 1.54; No. 152, 1.55; No. 153, 1.56; No. 154, 1.57; No. 155, 1.58; No. 156, 1.59; No. 157, 1.60; No. 158, 1.61; No. 159, 1.62; No. 160, 1.63; No. 161, 1.64; No. 162, 1.65; No. 163, 1.66; No. 164, 1.67; No. 165, 1.68; No. 166, 1.69; No. 167, 1.70; No. 168, 1.71; No. 169, 1.72; No. 170, 1.73; No. 171, 1.74; No. 172, 1.75; No. 173, 1.76; No. 174, 1.77; No. 175, 1.78; No. 176, 1.79; No. 177, 1.80; No. 178, 1.81; No. 179, 1.82; No. 180, 1.83; No. 181, 1.84; No. 182, 1.85; No. 183, 1.86; No. 184, 1.87; No. 185, 1.88; No. 186, 1.89; No. 187, 1.90; No. 188, 1.91; No. 189, 1.92; No. 190, 1.93; No. 191, 1.94; No. 192, 1.95; No. 193, 1.96; No. 194, 1.97; No. 195, 1.98; No. 196, 1.99; No. 197, 2.00; No. 198, 2.01; No. 199, 2.02; No. 200, 2.03; No. 201, 2.04; No. 202, 2.05; No. 203, 2.06; No. 204, 2.07; No. 205, 2.08; No. 206, 2.09; No. 207, 2.10; No. 208, 2.11; No. 209, 2.12; No. 210, 2.13; No. 211, 2.14; No. 212, 2.15; No. 213, 2.16; No. 214, 2.17; No. 215, 2.18; No. 216, 2.19; No. 217, 2.20; No. 218, 2.21; No. 219, 2.22; No. 220, 2.23; No. 221, 2.24; No. 222, 2.25; No. 223, 2.26; No. 224, 2.27; No. 225, 2.28; No. 226, 2.29; No. 227, 2.30; No. 228, 2.31; No. 229, 2.32; No. 230, 2.33; No. 231, 2.34; No. 232, 2.35; No. 233, 2.36; No. 234, 2.37; No. 235, 2.38; No. 236, 2.39; No. 237, 2.40; No. 238, 2.41; No. 239, 2.42; No. 240, 2.43; No. 241, 2.44; No. 242, 2.45; No. 243, 2.46; No. 244, 2.47; No. 245, 2.48; No. 246, 2.49; No. 247, 2.50; No. 248, 2.51; No. 249, 2.52; No. 250, 2.53; No. 251, 2.54; No. 252, 2.55; No. 253, 2.56; No. 254, 2.57; No. 255, 2.58; No. 256, 2.59; No. 257, 2.60; No. 258, 2.61; No. 259, 2.62; No. 260, 2.63; No. 261, 2.64; No. 262, 2.65; No. 263, 2.66; No. 264, 2.67; No. 265, 2.68; No. 266, 2.69; No. 267, 2.70; No. 268, 2.71; No. 269, 2.72; No. 270, 2.73; No. 271, 2.74; No. 272, 2.75; No. 273, 2.76; No. 274, 2.77; No. 275, 2.78; No. 276, 2.79; No. 277, 2.80; No. 278, 2.81; No. 279, 2.82; No. 280, 2.83; No. 281, 2.84; No. 282, 2.85; No. 283, 2.86; No. 284, 2.87; No. 285, 2.88; No. 286, 2.89; No. 287, 2.90; No. 288, 2.91; No. 289, 2.92; No. 290, 2.93; No. 291, 2.94; No. 292, 2.95; No. 293, 2.96; No. 294, 2.97; No. 295, 2.98; No. 296, 2.99; No. 297, 3.00; No. 298, 3.01; No. 299, 3.02; No. 300, 3.03; No. 301, 3.04; No. 302, 3.05; No. 303, 3.06; No. 304, 3.07; No. 305, 3.08; No. 306, 3.09; No. 307, 3.10; No. 308, 3.11; No. 309, 3.12; No. 310, 3.13; No. 311, 3.14; No. 312, 3.15; No. 313, 3.16; No. 314, 3.17; No. 315, 3.18; No. 316, 3.19; No. 317, 3.20; No. 318, 3.21; No. 319, 3.22; No. 320, 3.23; No. 321, 3.24; No. 322, 3.25; No. 323, 3.26; No. 324, 3.27; No. 325, 3.28; No. 326, 3.29; No. 327, 3.30; No. 328, 3.31; No. 329, 3.32; No. 330, 3.33; No. 331, 3.34; No. 332, 3.35; No. 333, 3.36; No. 334, 3.37; No. 335, 3.38; No. 336, 3.39; No. 337, 3.40; No. 338, 3.41; No. 339, 3.42; No. 340, 3.43; No. 341, 3.44; No. 342, 3.45; No. 343, 3.46; No. 344, 3.47; No. 345, 3.48; No. 346, 3.49; No. 347, 3.50; No. 348, 3.51; No. 349, 3.52; No. 350, 3.53; No. 351, 3.54; No. 352, 3.55; No. 353, 3.56; No. 354, 3.57; No. 355, 3.58; No. 356, 3.59; No. 357, 3.60; No. 358, 3.61; No. 359, 3.62; No. 360, 3.63; No. 361, 3.64; No. 362, 3.65; No. 363, 3.66; No. 364, 3.67; No. 365, 3.68; No. 366, 3.69; No. 367, 3.70; No. 368, 3.71; No. 369, 3.72; No. 370, 3.73; No. 371, 3.74; No. 372, 3.75; No. 373, 3.76; No. 374, 3.77; No. 375, 3.78; No. 376, 3.79; No. 377, 3.80; No. 378, 3.81; No. 379, 3.82; No. 380, 3.83; No. 381, 3.84; No. 382, 3.85; No. 383, 3.86; No. 384, 3.87; No. 385, 3.88; No. 386, 3.89; No. 387, 3.90; No. 388, 3.91; No. 389, 3.92; No. 390, 3.93; No. 391, 3.94; No. 392, 3.95; No. 393, 3.96; No. 394, 3.97; No. 395, 3.98; No. 396, 3.99; No. 397, 4.00; No. 398, 4.01; No. 399, 4.02; No. 400, 4.03; No. 401, 4.04; No. 402, 4.05; No. 403, 4.06; No. 404, 4.07; No. 405, 4.08; No. 406, 4.09; No. 407, 4.10; No. 408, 4.11; No. 409, 4.12; No. 410, 4.13; No. 411, 4.14; No. 412, 4.15; No. 413, 4.16; No. 414, 4.17; No. 415, 4.18; No. 416, 4.19; No. 417, 4.20; No. 418, 4.21; No. 419, 4.22; No. 420, 4.23; No. 421, 4.24; No. 422, 4.25; No. 423, 4.26; No. 424, 4.27; No. 425, 4.28; No. 426, 4.29; No. 427, 4.30; No. 428, 4.31; No. 429, 4.32; No. 430, 4.33; No. 431, 4.34; No. 432, 4.35; No. 433, 4.36; No. 434, 4.37; No. 435, 4.38; No. 436, 4.39; No. 437, 4.40; No. 438, 4.41; No. 439, 4.42; No. 440, 4.43; No. 441, 4.44; No. 442, 4.45; No. 443, 4.46; No. 444, 4.47; No. 445, 4.48; No. 446, 4.49; No. 447, 4.50; No. 448, 4.51; No. 449, 4.52; No. 450, 4.53; No. 451, 4.54; No. 452, 4.55; No. 453, 4.56; No. 454, 4.57; No. 455, 4.58; No. 456, 4.59; No. 457, 4.60; No. 458, 4.61; No. 459, 4.62; No. 460, 4.63; No. 461, 4.64; No. 462, 4.65; No. 463, 4.66; No. 464, 4.67; No. 465, 4.68; No. 466, 4.69; No. 467, 4.70; No. 468, 4.71; No. 469, 4.72; No. 470, 4.73; No. 471, 4.74; No. 472, 4.75; No. 473, 4.76; No. 474, 4.77; No. 475, 4.78; No. 476, 4.79; No. 477, 4.80; No. 478, 4.81; No. 479, 4.82; No. 480, 4.83; No. 481, 4.84; No. 482, 4.85; No. 483, 4.86; No. 484, 4.87; No. 485, 4.88; No. 486, 4.89; No. 487, 4.90; No. 48

World's Best. # gross, No. 1, \$12.00; No. 2, \$24.00.
No. 3, \$30.00.....dis 50&10 %
Universal.....# dos \$3.00, dis 35&5 %
Domestic.....# dos \$2.50, dis 45 %
Champion.....# dos \$2.00, dis 50 %

Cards.
Horse and Curry.....dis 10 @ 10&10 %
Cotton.....Now list, Aug., 1883, dis 10 %
Wool.....dis 10 %

Carpet Sweepers.
Cast Steel, Polished.....# dos \$3.25
Cast Iron, Steel Points.....# dos \$0.80
Society.....# dos \$1.75
Bulard's.....dis 25 @ 25&10 %

Carpet Sweepers.
Blissell No. 6.....# dos \$17.00
Blissell No. 7 New Drop Pan.....# dos \$19.00
Blissell No. 12 Hall Sweeper.....# dos \$36.00
Grand Rapid.....# dos \$27.00
Crown Jewel.....No. 1, \$18; No. 2, \$19; No. 3, \$20
Magic.....# dos \$15.00
Jewel.....# dos \$17.00
Mystic.....# dos \$16.00
Cottage.....# dos \$15.00
Garland.....# dos \$18.00
Parlor Queen.....# dos \$24.00
Housewife's Delight.....# dos \$15.00
Queen.....# dos \$16.00
Queen, with band.....# dos \$18.00
King.....# dos \$30.00
Weed Improved.....# dos \$18.00
Hub.....# dos \$16.00
Cox Wheel.....# dos \$16.00
Church.....each \$3.00

Cartridges—See Ammunition.
Casters.
Bed.....# New list
Plate.....# Brass, dis 55 %
Shallow Socket.....# Others, dis 60 %
Deep Socket.....# dis 60 %
Yale Casters, list May, 1884.....dis 30&10&40 %
Yale, Gem.....dis 60&80&5 %
Martin's Patent (Phoenix).....dis 45&10 @ 50 %
Payson's Anti-Lotion.....dis 30 %
"Giant" Truck Casters.....dis 10 @ 10&5 %
Stationary Truck Casters.....dis 45&10 %

Cattle Leaders.
Hudson, Beckley & Co.'s.....dis 75 @ 75&10 %
Sargent's.....dis 60&10 %
Hochkiss.....dis 30 %
Peck Stow & W. Co.....dis 50&10 %

Chain.
Trace, 5-16, exact sizes, # pair, \$1.09.....dis 50&10&5 %
Trace, 7-16, exact sizes, # pair, .92.....dis 50&10&7 1/2 %
NOTE.—Traces "Regular" sizes 8¢ net # pair less than exact.
Log, Fifth, Stretcher, and other Range Chains, list Nov. 1, 1884.....dis 50&10 @ 50&10&5 %
American Coil 3-16 1/4 5-16 3/4 7-16 1/2 9-16 1/4
In cask lots, 5 1/2 5.35 4.60 4.40 4.20 3.95 3.75
Less than cask lots, add 4¢ per #.
German Coil, list of June 20, 1887.....dis 60&80&5 %
Ger. Halter Chain, list of June 20, 1887.....dis 60&80&5 %
Covert Halter, Hitching and Breast.....dis 50&2 %
Covert Traces.....dis 35&2 %
Onelida Halter Chain (old list).....dis 45 %
Galvanized Ferno Chain.....dis 70&10 @ 75 %
Jack Chain, Iron.....dis 70&10 @ 75 %
Jack Chain, Brass.....dis 70&10 @ 75 %

Chalk.
White.....# gro 55¢
Red.....# gro 75¢
Blue.....# gro 90¢
White Crayons.....# gro 12¢ @ 12&4¢

Chalk Lines—See Lines.

Chisels.
Socket Framing and Firmer—
Wetherby and Douglas.....dis 75&10 @ 75, 10&5 %
P. S. & W.....dis 75, 10&5 %
New Haven and Middlesex.....dis 30 %
Mix.....dis 30 %
Ruck Bros.....dis 60&10 @ 60&10&5 %
Merrill.....dis 30 @ 30&5 %
L. & J. White.....dis 30 @ 30&5 %
Tanged Firmer.....dis 40&10 @ 50 %
Tanged Firmer, Butcher's.....\$4.75 @ \$5.00
Tanged Firmer, Spear & Jackson's.....\$5.00 to \$2
Tanged Firmer, Ruck Bros.....dis 30 %
Cold Chisels, #.....16¢ @ 13¢

Chucks.
Beach Patent.....each, each, \$8.00, dis 20 %
Morris's Adjustable.....each, \$7.00, dis 20 @ 20&5 %
Danbury.....each, \$6.00, dis 30 @ 30&5 %
Syracuse, Bais Pat.....dis 25 %

Clamps.
Providence Tool Co.'s Wrought Iron.....dis 25 %
Adjustable, Gray.....dis 20 %
Adjustable, Lumber's.....dis 20 %
Adjustable, Snow's.....dis 40&5 %
Adjustable, Hammer's.....dis 15 %
Adjustable, Stearns.....dis 20&10 %
Stearns' Adjustable Cabinet and Corner.....dis 60&20 %
Cabinet, Sargent's.....dis 60&20 %
Carriage Makers, Sargent's.....dis 60&20 %
Eberhart Mfg. Co.....dis 40&5 @ 40&10 %
Warner's.....dis 40&10 @ 40&10&5 %
Saw Clamps.....See Vices

Clips.
Norway Axle, 1/4 & 5-16.....dis 55&5&5 %
Second grade Norway Axle, 1/4 & 5-16.....dis 55&5 %
Superior Axle Clips.....dis 60&5 @ 60&5&5 %
Norway Spring Bar Clips, 5-16.....dis 50&5 %
Wrought-Iron Felloe Clips.....# 5¢
Steel Felloe Clips.....# 5¢

Cockeyes......dis 50 %
Cocks, Brass.
Hardware list.....dis 40&10&2 %

Coffee Mills.
Box and Side.....dis 50&10&2 %
Saylor's Patent.....\$9.50, dis 25 %
American, Enterprise Mfg. Co.....dis 20&10&30 %
The "Swift," Lane Bros.....dis 20&10 %
Webb's Patent.....dis 45 %

Compasses, Dividers, &c.
Compases, Calipers, Dividers.....dis 70 @ 70&10 %
Bemis & Call Co.'s Dividers.....dis 60&5 %
Bemis & Call Co.'s Compases & Calipers.....dis 50&5 %
Bemis & Call Co.'s Wing & Inside or Outside.....dis 50&5 %
Bemis & Call Co.'s Double.....dis 60 %
Bemis & Call Co.'s (Call's Patent Inside).....dis 30 %
Excelsior.....dis 50 %
J. Stevens & Co.'s Calipers and Dividers.....dis 25&10 %

Coopers' Tools.
Bradley's.....dis 20 %
Barton's.....dis 20 @ 20&5 %
L. & J. White.....dis 20&5 %
Albertson Mfg. Co.....dis 25 %
Beatty's.....dis 40 @ 40&5 %
Sandusky Tool Co.....dis 50 @ 30&5 %

Corkscrews.
Hudson & Beckley Mfg. Co.....dis 40 @ 40&10 %
Clough's Patent.....dis 35 @ 35&5 %
Howe Bros. & Halbert.....dis 45 %

Corn Knives and Cutters.

Bradley's.....dis 10 %
Wadsworth's.....dis 25 %
Cradles—Grain.....dis 50&10 @ 60 %

Crow Bars.
Cast Steel.....# 4¢
Iron, Steel Points.....# 3 1/2¢

Curry Combs.
Fitch's.....dis 50&10 @ 50&10&10 %
Rubber.....# dos \$10.00, dis 20 %
Perfect.....dis 50 %

Curtain Pins.
Silvered Glass.....net
White Enamel.....net

Cutlery.
Reaver Falls and Booth's.....dis 33 1/2 %
Wostenholme.....\$7.75 to \$2

Dampers, &c.
Dampers and Clips, Buffalo.....dis 40 %
Dampener.....dis 40 %
Excelsior.....dis 40&10 %

Dividers—See Compasses.
Dog Collars.
Embossed Gilt, Pope & Stevens' list.....dis 50&10 %
Leather, Pope & Stevens' list.....dis 40 %
Brass, Pope & Stevens' list.....dis 40 %

Door Springs.
Torrey's Rod, regular size.....# dos \$1.30
Gray's.....# gro, \$20.00, dis 20 %
Bee Rod.....# gro, \$20.00, dis 20 %
Warner's No. 1, # dos, \$2.50; No. 2, \$3.30, dis 40&10&50 %
Gem (Coll), list April 19, 1886.....dis 10 %
Star (Coll), list April 19, 1886.....dis 20 %
Victor (Coll).....dis 60 @ 60&10 %
Champion (Coll).....dis 60&10 @ 60&10&10 %
Philadelphia.....# dis, \$7.75, dis 35 %
Cowell's.....No. 1, # dos \$18.00; No. 2, \$15.00, dis 50 %
Rubber, complete.....# dos \$4.50, dis 55&10 %
Hercules.....dis 50 %
Shaw Door Check and Spring.....dis 25 @ 30 @ 35 %
Elliott's Door Check and Spring.....dis 25 %

Drawings & Rules.
Wetherby and Douglas.....dis 75&10 @ 75, 10&5 %
New Haven and Middlesex.....dis 60&10&10 %
Merrill.....dis 15&10 @ 25 %
Watrous.....dis 15&10 @ 25 %
L. & J. White.....dis 20&5 %
Bradley's.....dis 35 %
Adjustable Handle.....dis 20 @ 25 %
Wilkinson's Folding.....dis 25 @ 25&5 %

Drills and Drill Stocks.
Blacksmith's.....each, \$1.00 @ \$1.65
Blacksmith's Self-Feeding.....each, \$7.50, dis 20 %
Brest, P. S. & W.....dis 30&5 %
Brest, Wilson's.....each, \$3.00, dis 35 %
Brest, Millers Falls.....each, \$2.50, dis 25&10 @ 40 %
Ratchet, Merrill's.....dis 20 @ 20 & 5 %
Ratchet, Ingersoll's.....dis 25 %
Ratchet, Parker's.....dis 20 @ 20&5 %
Ratchet, Whitney's.....dis 20&10 %
Ratchet, Weston's.....dis 20&10 %
Ratchet, Moore's Triple Action.....dis 25 @ 30 %
Whitney's Hand Drill, Plain, \$11.00, Adjustable, \$12.00.....dis 20&10 %
Wilson's Drill Stocks.....dis 1 %
Automatic Boring Tools.....each, \$1.75 @ \$1.65
Twist Drills—
Morse.....dis 50&10&5 %
Standard.....dis 50&10&5 %
Syracuse.....dis 50&10&5 %
Cleveland.....dis 50&10&5 %
Williams.....dis 50&10&10 %

Drill Bits—See Augers and Bits.
Drill Chucks—See Chucks.
Dripping Pans.
Small sizes.....# D7 @ 8¢
Large sizes.....# D7 @ 8¢

Egg Beaters.
Blower.....# dos, \$2.50
National.....# dos, \$3.50
Family (P. S. & W. Co.).....# gro, \$17.00 @ \$18.00
Standard (Standard Co.).....# gro, \$9.00
Kingston (Standard Co.).....# gro, \$7.50
Acme (Standard Co.).....# gro, \$7.00
Duplex (Standard Co.).....# gro, No. 1, \$20; No. 2, \$15
Triumph (P. S. & W. Co.).....# gro, \$10.50 @ \$11.50
Advance No. 1.....# gro, \$10.50
Advance No. 2.....# gro, \$10.00
Bryant's.....# gro, \$15.00
Ayres' Spiral.....# gro, \$5
Paine, Diehl & Co.'s.....# gro, \$24.00
Electric Bell Sets, Wollensak's.....dis 15 %
Bigelow & Dowse.....dis 20 %
Emery.....40 gr. 150 gr. # FF
Kegs, #.....4¢ 5¢ 2 1/2¢
1/2 kegs, #.....4 1/2¢ 5 1/2¢ 2 3/4¢
1/4 kegs, #.....4 1/2¢ 5 1/2¢ 3¢
10-b cans, 10 in case 6¢ 6 1/2¢ 5¢
10-b means, less than 10¢ 10¢ 7 1/2¢

Enamelled and Tinned Ware—See Hollow Ware.

Escutcheon Pins.
Iron, list Nov. 11, 1885.....dis 50&10 @ 50&10&5 %
Brass.....dis 60 @ 60&5 %
Escutcheons.
Door Lock.....Same discounts as Door Locks
Brass Thread.....dis 60 @ 60&10 %
Wood.....dis 25 %

Faucets.
Fenn's.....dis 40 %
Bohren's Patent Rubber Ball.....dis 25 %
Fenn's Cork Stops.....dis 35 1/2 %
Star.....dis 60 @ 60&5 %
Frary's Patent Petroleum.....dis 60&10&2 %
West's Patent Key.....dis 45 %
Anchor Lock.....dis 45 %
Metallic Key, Leather Lined.....dis 55&10 @ 60&10 %
Cork Lined.....dis 70 @ 70&10 %
Burnside's Red Cedar, bbl. lots.....dis 50 %
J. Sommer's Best Black Tin Key.....dis 40 %
J. Sommer's Cork Lined, 1st quality.....dis 50 %
J. Sommer's Perfection, Fin. Red Cedar.....dis 50 %
J. Sommer's Goodenough Cedar.....dis 60 %
Self-Measuring, Enterprise.....# dos \$36.00—dis 20&10 %
Self-Measuring, Lane's.....# dos \$36.00—dis 25&10 %
Self-Measuring, Victor.....# dos \$36.00—dis 25&10 %

Felloe Plates......# 6 @ 6 1/2¢
Fifth Wheels.—Derby and Cincinnati.....dis 45&5 %

Fliers.
Domestic—
Best brands.....dis 60&10 @ 60&10&5 %
Good brands.....dis 60&10&5 @ 60&10&10 %
Fair brands.....dis 70 @ 70&10 %
Heller's Horse Rasps.....dis 50&7 1/2 @ 50&10 %
Importers.
J. & Riley Carr.....List, April 1, 1883, dis 15 %
J. & Riley Carr Horse Rasps.....dis 19 %
Moss & Gamble.....List April 1, 1883, dis 15 %
Butcher.....Butcher's list, dis 20 %
Stubbs.....Stubbs list, dis 25 @ 30 %
Turton's.....Turton's list, dis 20 @ 25 %
Greaves Horse Rasps.....American list, dis 60 %

Fluting Machines.

Knox, 4 1/2-inch Roll.....\$3.25 each, dis 35 %
Knox, 6-inch Roll.....\$5.00 each, dis 35 %
Eagle, 3 1/2-inch Roll.....\$2.15, dis 35 %
Eagle, 5 1/2-inch Roll.....2.85, dis 35 %
Crown, 4 1/2 in., \$3.50; 6 in., \$4.00; 8 in., \$6.50 each, dis 35 %
Crown Jewel.....6 in., \$2.50 each, dis 35 %
American, 5 in., \$3; 6 in., \$3.40; 7 in., \$4.50 each, dis 35 %
Domestic Fluter.....\$1.50 each, net
Geneva Hand Fluter, White Metal.....# dos \$12, dis 25 %
Crown Hand Fluter, No. 1, \$15; 2, \$12.50; 3, \$10, dis 30 %
Shepard Hand Fluter, No. 85.....# dos \$15.30, dis 40 %
Shepard Hand Fluter, No. 110.....# dos \$11, dis 40 %
Shepard Hand Fluter, No. 95.....# dos \$8, dis 40 %
Clark's Hand Fluter.....# dos \$15.00, dis 35 %
Combined Fluter and Sad Iron.....# dos \$10.00, dis 30 %
Buffalo.....# dos \$10.00, dis 10 %

Fluting Scissors......dis 45 %
Forks.—Hay, Manure, &c. Asso. list.....dis 65&5 %
Hay, Manure, &c. Phila. list.....dis 60 @ 60&5 %
Plated, see Spoons.

Freezers, Ice Cream.
Lightning.....dis 65 %

Fruit and Jelly Presses.
Enterprise Mfg. Co.....dis 20&10 @ 30 %
Henis.....dis \$4.50
Queen City.....dis 40 %

Fry Pans.
Association list.....dis 75 @ 75&10 %
No. 1.....3 1/2 5 7 8
dos.....\$3.75 4.70 5.30 5.95 6.55 7.50 8.75 10.00 11.25
1000 ft.

Fuse.
Common Hemp Fuse, for dry ground.....\$2.70
Common Cotton Fuse, for dry ground.....2.85
Single Taped Fuse, for wet ground.....4.75
Double Taped Fuse, for very wet ground.....6.00
Triple Taped Fuse, for very wet ground.....7.25
Small Gutta Percha Fuse, for water.....7.50
Large Gutta Percha Fuse, for water.....12.00

Gauges.
Marking Mortise, &c.....dis 60&10 %
Wire, low list.....dis 10&10 %
Wire, Wheeler, Madden & Co.....dis 10 %
Wire, Morse's.....dis 50 @ 50&5 %
Wire, Brown & Sharpe's.....dis 10 @ 20 %

Glimlets.—Nail and Spike......dis 50&10&5 %
"Eureka" Glimlets.....dis 40&10 %
"Diamond" Glimlets.....# gross \$5.00
Double Cut, Sheppardson's.....dis 45 @ 45&5 %
Double Cut, Ives.....dis 60 @ 60&5 %
Double Cut, Douglas.....dis 40&10 %
"Bee".....# gross \$12, dis 25 @ 25&5 %

Glue Pots.
Tinned and Enamelled.....dis 40&5 @ 40&10 %
Family, Howe's "Eureka".....dis 40 %
Family, L. F. & C.'s "Handy".....dis 50 %

Grindstone Fixtures.
Sargent's Patent.....dis 70&10 %
Reading Hardware Co.....dis 30&10 %

Hack Saws.—See Saws.

Halters.—Covert's Pat. 1/4 Jute......dis 50&2 %
Covert's Hemp Horse and Cattle Tie.....dis 50&2 %
Covert's Jute Horse and Cattle Tie.....dis 60&10&2 %

Hammers.
Handled Hammers.
Maddox's.....List Dec. 1, 1885, dis 25 @ 25&10 %
Buffalo Hammer Co.....List Jan. 15, '87
C. Hammond & Son.....dis 50 @ 50&5 %
Hudson & Beckley.....10 %
Atha Tool Co.....dis 5 %
Verree.....dis 5 %
Magnetic Tack, Nos. 1, 2, 3, \$1.25, 1.50 & 1.75, dis 30&10 %
Nelson Tool Works.....dis 40&10 %
Warner & Nobles.....dis 20 @ 25 %
Peck Stow & Wilson.....dis 40 %
Sargent's.....dis 35&10 %

Heavy hammers and Sledges.
3 lb and under.....# 40¢
3 to 5 lb.....# 36¢
Over 5 lb.....# 30¢
Wilkinson's Smith's.....10¢ @ 11¢

Hand Cuffs and Leg Irons.
Providence Tool Co., Hand Cuffs, \$15.00 # dos.....dis 10 %
Providence Tool Co., Leg Irons, \$25.00 # dos.....dis 10 %
Tower's.....dis 25 %
Daley's Improved Hand Cuffs: 2 Hands, Polished, # dos, \$48; Nickeled, \$57; 3 Hands, Polished, # dos, \$72; Nickeled, \$84.....dis 20 %

Handles.
Iron, Wrought or Cast—
Door or Thumb.
Nos.....0 1 2 3 4.....dis 60&10&10 %
Per dos, \$0.90 1.00 1.18 1.35 1.50.....dis 30 @ 35 %
Rogers's Latches.....# dos, 30¢ @ 35¢
Bronze Iron Drop Latches.....# dos, 70¢ net
Jap'd Store Door Handles—Nuts, \$1.62; Plate, \$1.10; no Plate, \$0.88.....net
Barn door.....# dos, \$1.40, dis 40 %
Chest and Lifting.....dis 70 %

Handles, Wood.
Saw and Plane.....dis 40&10 @ 40&10&5 %
Hammer, Hatchet, Axe, Sledge, &c.....dis 35 %
Brad Axl.....# gross \$2.00
Hickory Firmer Chisel, assorted.....# gross 4.50
Hickory Firmer Chisel, large.....# gross 5.00
Apple Firmer Chisel, assorted.....# gross 5.00
Apple Firmer Chisel, large.....# gross 6.00
Socket Firmer Chisel, assorted.....# gross 3.00
Socket Framing Chisel, assorted.....# gross 5.00
J. B. Smith Co.'s Pat. File.....dis 50 %
File, assorted.....# gross 2.75, dis 40 %
Auger, assorted.....# gross 5.00, dis 40 %
Auger, large.....# gross 7.00, dis 40 %
Patent Auger, Ives.....dis 30&10 %
Patent Auger, Douglas.....# net \$1.25 net
Patent Auger, Swan's.....# net \$1.00 net
Hoe, Rake, Shovel, &c.....dis 50&10 %
Cross Cut Saw Handles.
Atkins' No. 1 Loop, # pair, 30¢ No. 3, 22¢; No. 2 and No. 4 Reversible, 22¢
Boynton's Loop Saw Handles.....50¢, dis 60 %
Champion.....dis 15 %

Hangers.
Barn Door, old patterns.....dis 60&10&10 @ 70 %
Barn Door, New England.....dis 60&10&10 @ 70 %
Samson Steel Anti-Friction.....dis 55 %
Orleans Steel.....dis 55 %
Harrison Wrought Wood Track.....dis 55 %
U. S. Wood Track.....dis 65 %
Champion.....dis 60&10 %
Rider and Wooster, Medina Mfg. Co.'s list.....dis 70 %
Climax Anti-Friction.....dis 55 %
Climax Steel Anti-Friction.....dis 50 %
Zeuthen for Wood Track.....dis 55 %
Reed's Steel Arm.....dis 40 %
Challenge, Barn Door.....dis 50 %
Sterling Improved (Anti-Friction).....dis 65&10 %
Victor, No. 1, \$15; No. 2, \$10.50; No. 3, \$18.....dis 50&2 %
Cheritree.....dis 50&5 %
Kiddie's.....dis 50&10 @ 60 %
The "Boss".....dis 90 %

Best Anti-Friction.....	dis 60
Duplex (Wood Track).....	dis 60
Terry's Patent.....	dos. pr. 3 1/2 in. \$10; 5 in. \$12
Cronk's Patent.....	No. 4, \$13; No. 5, \$14.40; No. 6, \$15.50
Wood Track, Iron Clad.....	ft. 104, dis 50.10 @ 50.15
Architect.....	set \$5.00, dis 20
Eclipse.....	dis 20.10
Felix.....	set \$4.50, dis 20
Lane's Steel Anti-Friction.....	dis 40.10
The Ball Bearing Door Hanger.....	dis 20.10 @ 25.10
Warner's Patent.....	dis 20.10 @ 25.10
Stearns' Anti-Friction.....	dis 20 @ 20.10
Stearns' Challenge.....	dis 25.10 @ 25.10.10
Faultless.....	dis 40 @ 40.10
American.....	set \$6; dis 20.10
Rider & Wooster, No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000	

Harness Snaps.—See Snaps.

Hatchets.—List Jan. 1, 1888.

Isaiah Blood.....	dis 35 @ 40
Hunt's Hatchet.....	dis 40.10
Hunt's Broad.....	dis 40
Buffalo Hammer Co.....	dis 40.10 @ 50.10
Hurd's.....	dis 40.10 @ 40.10.10
Yerkes & Plumb.....	dis 40.10 @ 40.10
Wm. Mann, Jr., & Co.....	dis 50 @ 50.10
Underhill Edge Tool Co.....	dis 40.10 @ 40.10
Underhill's Haines and Bright goods.....	dis 33 1/2
C. Hammond & Son.....	dis 40.10 @ 50
Simmons.....	dis 35 @ 40
Peck's.....	dis 40.10 @ 40.10.10
Kelly's.....	dis 50 @ 50.10
Sargent & Co.....	dis 50
Ten Eyck Edge Tool Co.....	dis 40.10 @ 40.10
Collins, following list.....	dis 10
Shingling, Nos. 1, 2, 3.....	dis 50.10 @ 50.10
Claw, Nos. 1, 2, 3.....	dis 50.10 @ 50.10
Lathing, Nos. 1, 2, 3.....	dis 50.10 @ 50.10

Hay Knives.

Lighting.....	Mfrs. price \$1.00
Electric.....	dis 25; Jobber's Extras
Gen.....	dis 27; dis 30
Wadsworth's.....	dis 28; dis 30
Carter's Needle.....	dis 11.50 @ 12.00
Heath's.....	dis 13.50 @ 14.00

Hinges.

Wrought Iron Hinges—	
Screw Hook and Eye, 10, 12 in. 1/2.....	dis 70.10 @ 70.10
Strap.....	dis 14 @ 30 in. 1/2
Heavy Welded Hook.....	dis 14 in. 1/2 @ 25
Screw Hook and Eye.....	dis 14 in. 1/2 @ 25
Roller Blind Hinges, Nos. 22 and 23.....	dis 50.10
Roller Blind.....	dis 50.10
Roller Raised.....	dis 70.10
Plate Hinges, 8, 10 and 12 in. 1/2.....	dis 40
"Providence" over 12 in. 1/2.....	dis 30

Spring Hinges—	
Geer's Spring and Blank Butts.....	dis 10
Union Spring Hinge Co., March, 1888.....	dis 10
Acme, Crown, Empire and U. S.....	dis 10
American, Gem, and Star, Japanned.....	dis 10
American, Gem, and Star, Bronzed.....	dis 10
Oxford, Bronze and Brass.....	dis 10
Barker's Double Acting.....	dis 10
Union Mfg. Co.....	dis 10
Bommer's.....	dis 10
Buckman's.....	dis 10
Chicago.....	dis 10

Gate Hinges—	
Western.....	dis \$4.40, dis 56
N. E.....	dis \$7.00, dis 55
N. E. Reversible.....	dis \$5.20, dis 56 1/2
Clark's, Nos. 1 2 3.....	dis 60 1/2 @ 60 1/2 1/2
N. Y. State.....	dis 56.00, dis 56 1/2
Automatic.....	dis \$15.50, dis 56
Common Sledge.....	dis pair \$4.40, dis 56
Seymour's.....	dis 45 1/2
Shepard's, Nos. 1, 2, 10 and 20.....	dis 60 1/2 @ 60 1/2 1/2
Shepard's, No. 3.....	dis 60 1/2 @ 60 1/2 1/2

Patent	15¢
Cable Laid Italian	22½¢
India Cable Laid	12½¢
Silver Lake, A Quality, White	50¢ dis 10¢ 104½¢
Silver Lake, A Quality, Drab	55¢ dis 10¢ 104½¢
Silver Lake, B Quality, White	60¢ dis 10¢ 104½¢
Silver Lake, B Quality, Drab	65¢ dis 10¢ 104½¢
Silver Lake, C Quality, White only	27½¢ @ 20
Sylvan Spring, Extra Braided, White	34½¢
Sylvan Spring, Extra Braided, Drab	30¢
Semper Idem, Braided, White	30¢
Egyptian, India Hemp, Braided	25¢
Samson, Braided, White	50¢ dis 30¢ 304½¢
Samson, Braided, Drab	55¢ dis 30¢ 304½¢
Samson, Braided Indian Hemp	55¢ dis 30¢ 304½¢
Samson Braided Luen	60¢ dis 30¢ 304½¢

Sash Locks.
Clark's No. 1, \$10.00; No. 2, \$8.00 *gro.*..... *dis* 33½
Ferrugun's..... *dis* 33¾
Morris and Triumph, list Aug. 16, 1886, *dis* 30½ @ 60
Walkers..... *dis* 10
Attwell Mfg. Co..... *dis* 25 @ 33½
Reading..... *dis* 65½ @ 10 @ 65½ @ 10½ @
Hammond's Window Springs..... *dis* 40
Common Sense, Jap. d. Cop'd and Br'ed., *gro.* \$4.10
Common Sense, Nickel Plated..... *gro* 11.00
Universal..... *dis* 30
Kernsball's Gravity..... *dis* 60
Hugunin's Patent, list Feb. 15, 1886..... *dis* 60½ @ 70
Corbin's Daisy, list February 15, 1886..... *dis* 70
Payson's Perfect..... *dis* 50½ @ 105 @ 60
Hugunin's New and Improved Adjustable Sash Bal-
ances, list Jan. 5, 1887..... *dis* 25½ @ 2
Hugunin's New Sash Locks, list Jan. 5, '87, *dis* 25½ @ 2
Stoddard "Practical"..... *dis* 10
Ives Patent..... *dis* 55 @ 55½
Liechke's Nos. 100 & 110 *gro.* \$8; 105, \$10, \$10 20½ @

Navis, Monroe & Barnes Mfg. Co.	.....	dis 50
Shash Weights.		
Solid Eyes.....	1 ton, \$22.50 @ \$25	
Sausage Stuffers or Fillers.		
Miles' "Challenge".....	1 doz. \$20, dis 50 @ \$25	
Perry.....	1 doz. No. 1 \$15 No. 0 \$21, dis 60 @ \$25	
Draw Cut No. 4.....	each, \$30.00, dis 20	
Enterprise Mfg. Co.	dis 20 @ 10 30	
Stewart's	dis 40 @ 10	

Dixton's Circular.....dis 45@45&5 ¢, Extras often
Dixton's Cross Cuts.....dis 45@45&5 ¢, given by job-
bers.
Dixton's Hand.....dis 25@25&5 ¢.
Atkins' Circular.....dis 50@50&5 ¢.....dis 50 ¢
Atkins' Silver Steel Diamond X Cuts.....foot 75 ¢
Atkins' Concave Tooth Dexter X Cuts.....foot 55 ¢
Atkins' Special Steel Diamond X Cuts.....foot 32 ¢
Atkins' Champion and Electric Tooth X Cuts.....foot 30 ¢

Atkins' Holly Back X Cuts..... ♀ foot 21 @ 22¢
 Atkins' Shingle, Mulya, Drag, &c..... dis 45 ¢
 W. M. & C. Hand..... dis 30 & 35 @ 30 & 210 ¢
 W. M. & C. Champion X Cuts, Regular ♀ foot 24 @ 20 ¢
 W. M. & C. X Cuts, Thin Back..... ♀ foot 27 & 29 ¢
 Peace Circular and Mill..... dis 45 & 10 ¢
 Peace Hand Panel and Rip..... dis 20 & 10 @ 20 & 10 & 10 ¢
 Peace Cross Cuts, Standard..... ♀ foot 25 ¢
 Peace Cross Cuts, Thin Back..... ♀ foot 27 & 28 ¢
 Richardson's Circular and Mill..... dis 45 & 45 & 10 ¢

Hack Saws—
 Griffin's Hack Saws, complete.....ds 40x10 @ 50¢
 Griffin's Hack Saw, Blades only.....ds 40x10 @ 50¢
 Star Hack Saws and Blades.....ds 25¢
 Diamond Hack Saws and Blades.....ds 25¢
 Eureka and Crescent.....ds 25¢

Saw Frames.
 White Vermont.....\$ 1.50 \$2 @ 10¢
 Red, Polished, and Varnished.....ds \$1.50. ds 2 @ 10¢

Saw Nags.
Stillman's Genuine.... \times dos \$5.00 and \$7.75, dis 40 & 5
Stillman's Imita.... \times dos \$3.25 and \$5.25, dis 40 & 5
Common Layer..... \times dos \$2.00, dis 40 & 5
Morrill's No. 1, \$15.00; Nos. 3 & 4, \$24.... \times dis 40 & 10
Leach's.....No. 0, \$9.00; No. 1, \$15.00, dis 15 & 20
Nash's..... \times dis 20 & 10
Hammer, Biehleke..... \times \$5.50, dis 30 & 5
Hammer, Berns & Co.'s new Patent..... \times dis 30 & 5
Reming's Cold Co.'s new Hammer..... \times dis 30 & 5

Bemis & Call Co.'s Plate	.....	dis 10
Bemis & Call Co.'s Cross Case	.....	dis 124 1/2
Alken's Genuine	.....	\$13.00, dis 50 & 10 1/2
Alken's Imitation	.....	\$7.00, dis 50 & 10 1/2
Hart's Patent Lever	.....	dis 20 & 10 1/2
Dixton's, Star, 40, No. 15, 45.50, dis 20 & 10 & 10 & 10 & 10 & 10	.....	dis 20 & 10 & 10 & 10 & 10
Atkins' Lever	.....	per doz No. 1, \$6.00; No. 2, \$9.60
Atkins' Criterion	.....	per doz \$7.00 & \$7.50
Croissant, Keller, No. 1, \$15.00; No. 2, \$24.00, dis 33 1/2 & 10 1/2	.....	dis 33 1/2 & 10 1/2

SAW TOOLS.
Atkins Perfection... \$15.00; Excelsior \$6.00 $\frac{1}{2}$ doz.

Meaties.
Batch, Counter. No. 171, good quality... $\frac{1}{2}$ doz \$21.00
Hatch, Tea. No. 181..... $\frac{1}{2}$ doz \$6.75 @ \$7.00
Union Platform, Plain..... \$2.30 @ \$2.35
Union Platform, Striped..... \$2.40 @ 2.50
Chatillon's Grocers' Trip Scales..... \$15.50 $\frac{1}{2}$ doz
Chatillon's Eureka..... \$18.25 $\frac{1}{2}$ doz
Chatillon's Favorite..... \$18.40 $\frac{1}{2}$ doz

Scale Beams.
Scale Beams List of Jan. 12, '82. dis 50c10c50c10c85c
Scale Beams Crister.....dis 30c89c
Chaffillon's No. 1.....dis 40c
Chaffillon's No. 2.....dis 50c

Scrapers.
Adjustable Box Scraper (S. R. & L. Co.) \$6.50, dis 30c10c
Box, 1 Handle.....\$ don \$4.00, dis 10c

Box, 2 Hand.....	dos \$6.00,	dis 10%
Deftance Box and Ship.....	dis 10%	dis 20% 10
Foot.....	dis 50%	dis 10% 60
Ship, Common.....	dos \$3.50 net	
Ship, Providence Tool Co.....	dis 10%	

Screen Window and Door Frames.		
Porter's Pat. Window and Door Frame.....	dis 33%	dis 10%
Screen Corner Irons. Warner's.....	dis 33%	dis 3% 10
Stearns' Frames and Corners.....	dis 23%	dis 10%

Screw Drivers.

Douglas Mfg Co.	.....dis	204108104
Dixie	.....dis	454101
Dixie Patent Excelsior	.....dis	454101
Buck Bros	.....dis	30
Stanley R. & Co. Varnish Handles	.....dis	654101
Stanley R. & Co.'s Black Handles	.....dis	602101
Sargent & Co.'s No. 1 Forged Blade	.....dis	70 & 108101
Sargent & Co.'s No. 20	.....dis	689 & 108101
Sargent & Co.'s Nos. 40 & 30, Cast Steel	.....dis	608101
Sargent & Co.'s No. 60, Round Blade	.....dis	708101

Knapp & Cowles' No. 1	dis 89 20 @ 70 1
Knapp & Cowles' No. 1 Extra	dis 80 @ 60 8 10
Knapp & Cowles No. 00 & 4	dis 50 85 @ 50 10 1
Stearns'	dis 25 8 10 & 5
Gay & Parsons	dis 35
Champion	dis 25
Clark's Patent	dis 30 @ 35 94
Crawford's Adjustable	dis 30
Ellis's Socket and Catcher	dis 25 @ 40 1
Spill's Patent 1st	dis 25
Kuhl's Combar Saw	dis 55 10

NOTE: COMMON SENSE.....P. 406 97, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 91

Syracuse Screw-Drivers Bits.....dis 30 & 30.25
Screw Driver Bits.....dis 50 & 50.25
Screw Driver Bits, Farr's.....dis 50 & 50.25
Pray's Hot. Hdr. Sets, No. 3, 12.....dis 25 & 25.10
P. D. & Co.'s, all Steel.....dis 50 & 50.25

Screws.
Wood Screws—List, Brass, Jan. 27; Iron, July 1, 1887
Flat Head Iron.....dis 70 & 70.25
Round Head Iron.....dis 85 & 85.25
Flat Head Brass.....dis 85 & 85.25
Round Head Brass.....dis 85 & 85.25
Flat Head Bronze.....dis 85 & 85.25
Round Head Bronze.....dis 85 & 85.25
Ex. 10% often given by jobbers.

Machines.
Flat Head Iron.....dis 55 & 55.25
Round Head Iron.....dis 50 & 50.25
Bench and Hand.
Bench, Iron.....dis 55 & 55.25
Bench, Wood, Hickory.....dis 20 & 20.25
Hand, Wood.....dis 25 & 25.25
Lax, Blunt Point.....dis 70 & 70.25
Cochran and Lag, Blunt Point.....dis 60 & 60.25
Bed.....dis 25 & 25.25
Hand Rail, Sargent's.....dis 60 & 60.25
Hand Rail, Ramson, Beckley & Co.'s.....dis 70 & 70.25
Hand Rail, Am. Screw Co.....dis 75 & 75.25
Jack Screws, Millers Falls list.....dis 50 & 50.25
Jack Screws, P. S. & W.....dis 35 & 35.25
Jack Screws, Sargent.....dis 60 & 60.25
Jack Screws, Stearns.....dis 40 & 40.25

Scroll Saws.
Lester, complete, \$10.00.....dis 25 & 25.25
Rogers, complete, \$4.00.....dis 25 & 25.25

Scythe Months.
dis 50 & 50.25
Shears.
American (Cast) Iron.....dis 75 & 75.25
Pruning.....dis 85 & 85.25
Barnard's Lamp Trimmers.....dis 20 & 20.25
Timbers.....dis 20 & 20.25
Seymour's, List, Dec. 1881, dis 60 & 60.25
Helmach's, List, Dec. 1881, dis 60 & 60.25
Helmach's Tailor's Shears.....dis 35 & 35.25
First quality C. S. Trimmers.....dis 80 & 80.25
Second quality C. S. Trimmers.....dis 10 & 10.25
Acme Cast Shears.....dis 10 & 10.25
Diamond Cast Shears.....dis 10 & 10.25
Clipper.....dis 10 & 10.25
Victor Cast Shears.....dis 75 & 75.25
Howe Bros. & Hulbert, Solid Forged Steel.....dis 40 & 40.25
Cleveland Machine Co., Solid Steel Forged.....dis 70 & 70.25

Shovels.
Sliding Door.....dis 50 & 50.25
M. W. & Co., List Jan. 1, 1887.....dis 50 & 50.25
R. & E. list Dec. 18, 1885.....dis 50 & 50.25
Corbin's list.....dis 60 & 60.25
Patent Roller.....dis 60 & 60.25
Patent Roller, Hatfield's.....dis 75 & 75.25
Russell's Anti-Friction, list Dec. 18, 1885.....dis 60 & 60.25
Moore's Anti-Friction.....dis 60 & 60.25

Sliding Shutters.
R. & E. list Dec. 18, 1885.....dis 60 & 60.25
Sargent's list.....dis 60 & 60.25
Reading list.....dis 60 & 60.25

Ship Tools.
L. & J. White.....dis 20 & 20.25
Albertson Mfg. Co.....dis 25 & 25.25

Shoes, Horse, Mule, &c.
Horse—Burden's, Perkins', Phoenix, at factory.....\$4.00
Mule—Add \$1 & 1/2 kg to above prices.

Ox Wrought.
Ton lots.....dis 90 & 90.25
1000 lb lots.....dis 90 & 90.25
500 lb lots.....dis 100 & 100.25

Shot.—(Eastern prices, 2¢ off, cash, 5 days.)
Drop, 25 bag, 5 lb.....\$1.50
Drop, 25 bag, 5 lb.....\$1.75
Drop, 25 bag, 5 lb.....\$1.75
Drop, 25 bag, 5 lb.....\$1.75
Drop, 25 bag, 5 lb.....\$1.75

Shovels and Spades.
Ames' Shovels, Spades, &c., list Nov. 1, 1885.....dis 20 & 20.25
NOTE.—Jobbers frequently give 5 & 7% extra on above.

Griffith's Black Iron.....dis 50 & 50.25
Griffith's Black Iron.....dis 50 & 50.25
Griffith's Solid Cast Steel R. R. Goods.....dis 20 & 20.25
Old Colony (Sanford Fork & Tool Co.).....dis 20 & 20.25
St. Louis Shovel Co.....dis 15 & 15.25
Hussey, Binn & Co.....dis 15 & 15.25
Hubbard & Co.....dis 20 & 20.25
Lehigh Mfg. Co.....dis 50 & 50.25
Payne Petchen & Son, list January, 1886.....dis 30 & 30.25
Remington's (Lowman's) Patent.....dis 30 & 30.25
Rowland's, Black Iron.....dis 50 & 50.25
Rowland's Steel.....dis 60 & 60.25

Shovels and Tongs.
Iron Head.....dis 60 & 60.25
Brass Head.....dis 60 & 60.25

Skins, Thimble.
Western list.....dis 75 & 75.25
Columbus Wrt. Steel, list Nov. 1, 1887.....dis 20 & 20.25

Sieves.
Buffalo Metallic, S. S. & Co., new list.....dis 50 & 50.25
Barley Flour Sieves.....dis 20 & 20.25
Smith's Adjustable Sieves.....dis 20 & 20.25
Smith's Adjustable Milk Strainer.....dis 20 & 20.25
Smith's Adjustable F. & C. Strainer.....dis 20 & 20.25
Sieves, Wooden (Am)—Iron, Plated.
Mesh 18, Nested, 70¢.....\$1.00
Mesh 20, Nested, 70¢.....\$1.00
Mesh 24, Nested, 70¢.....\$1.00

Slates.—School, by case.....dis 40 & 40.25

Snaps, Harness, &c.
Anchor (T. & S. Mfg Co.).....dis 65 & 65.25
Fitch's (Bristol).....dis 60 & 60.25
Hotchkiss.....dis 60 & 60.25
Adrian.....dis 60 & 60.25
Sargent's Patent Guarded.....dis 70 & 70.25
German, new list.....dis 40 & 40.25
Covers.....dis 50 & 50.25
Covert, New Patent.....dis 50 & 50.25
Covert New R. E.....dis 50 & 50.25
Covert Spring.....dis 60 & 60.25

Soldering Irons.
Covert's Adjustable list Jan. 1, 1886.....dis 35 & 35.25

Spoke Shaves.—Iron.....dis 45 & 45.25
Wood.....dis 30 & 30.25
Bailey's (Stanley R. & L. Co.).....dis 40 & 40.25
Stearns.....dis 20 & 20.25

Spoke Trimmers.
Bonney's.....dis 10.00, dis 50 & 50.25
Stearns.....dis 20 & 20.25
Ives.....dis 15.00, No. 2, \$12.00 per doz, dis 55 & 55.25
Douglass.....dis 30.00, dis 20 & 20.25

Spoons and Forks.
Tinned Iron—Basting, Central Stamping Co.'s list, dis 70 & 70.25
Solid Table and Tea, Central Stamping Company's list, dis 70 & 70.25
Buffalo, S. S. & Co.....dis 35 & 35.25

Silver-Plated.
Meriden Brit. Co., Rogers.....dis 50 & 50.25
C. Rogers & Bros.....dis 50 & 50.25
Rogers & Bro.....dis 50 & 50.25
Reed & Barton.....dis 50 & 50.25
Wm. Rogers Mfg. Co.....dis 50 & 50.25
Simpson, Hall, Miller & Co.....dis 50 & 50.25
Holmes & Edwards Silver Co.....dis 50 & 50.25
H. & E. Silver Co., Mexican Silver.....dis 50 & 50.25
H. & E. Silver Co., Durham Silver.....dis 50 & 50.25
German Silver.....dis 50 & 50.25
Dieton's Try Square & T Bevels.....dis 45 & 45.25
Nickel Silver.....dis 50 & 50.25
Britannia.....dis 55 & 55.25

Springs.
Elliptic, Concord, Platform and Half Scroll.....dis 60 & 60.25
Oil & Bolster Springs.....dis 20 & 20.25

Squares.
Steel and Iron.....dis 70 & 70.25
Nickel-Plated.....dis 70 & 70.25
Try Square and T Bevels.....dis 60 & 60.25
Dieton's Try Square & T Bevels.....dis 45 & 45.25
Winterbottom's Try and Miter.....dis 30 & 30.25

Staples.
Fence Staples, Galvanized.....dis 4 & 4.25
Fence Staples, Plain.....dis 4 & 4.25

Steelyards.
dis 40 & 40.25

Stocks and Dies.
Blacksmith's, Waterford Goods.....dis 30 & 30.25
Lighting Screw Plates.....dis 25 & 25.25
Reese's New Screw Plates.....dis 35 & 35.25

Stone.
Hindustan No. 1, 2, 3; Axe, 3 1/2; Slips No. 1, 2, 3
Sand Stone.....dis 20 & 20.25
Washta Stone, Extra.....dis 10 & 10.25
Washta Stone, No. 1.....dis 15 & 15.25
Washta Stone, No. 2.....dis 11 & 11.25
Washta Stone, No. 1, Extra.....dis 40 & 40.25
Washta Stone, No. 1, 4 to 9 in.....dis 30 & 30.25
Arkansas Stone, No. 1, 6 to 9 in.....dis 15 & 15.25
Turkey Oil Stone.....dis 40 & 40.25
Turkish Slips.....dis 10 & 10.25
Lake Superior, Chase.....dis 30 & 30.25
Rubber, 3 1/2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1170, 1171, 1172, 1173, 1174, 1175, 1176, 1177, 1178, 1179, 1180, 1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1216, 1217, 1218, 1219, 1220, 1221, 1222, 1223, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1243, 1244, 1245, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1259, 1260, 1261, 1262, 1263, 1264, 1265, 1266, 1267, 1268, 1269, 1270, 1271, 1272, 1273, 1274, 1275, 1276, 1277, 1278, 1279, 1280, 1281, 1282, 1283, 1284, 1285, 1286, 1287, 1288, 1289, 1290, 1291, 1292, 1293, 1294, 1295, 1296, 1297, 1298, 1299, 1300, 1301, 1302, 1303, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1322, 1323, 1324, 1325, 1326, 1327, 1328, 1329, 1330, 1331, 1332, 1333, 1334, 1335, 1336, 1337, 1338, 1339, 1340, 1341, 1342, 1343, 1344, 1345, 1346, 1347, 1348, 1349, 1350, 1351, 1352, 1353, 1354, 1355, 1356, 1357, 1358, 1359, 1360, 1361, 1362, 1363, 1364, 1365, 1366, 1367, 1368, 1369, 1370, 1371, 1372, 1373, 1374, 1375, 1376, 1377, 1378, 1379, 1380, 1381, 1382, 1383, 1384, 1385, 1386, 1387, 1388, 1389, 1390, 1391, 1392, 1393, 1394, 1395, 1396, 1397, 1398, 1399, 1400, 1401, 1402, 1403, 1404, 1405, 1406, 1407, 1408, 1409, 14